Y4.Sm1:Su7/3

SUPERFUND INNOVATIVE CLEANUP TECHNOLOGIES

COMPLETED
216.
ORIGINAL

HEARING

BEFORE THE

SUBCOMMITTEE ON ENERGY, ENVIRONMENT, AND SAFETY ISSUES AFFECTING SMALL BUSINESS

OF THE

COMMITTEE ON SMALL BUSINESS HOUSE OF REPRESENTATIVES

NINETY-NINTH CONGRESS

FIRST SESSION

WASHINGTON, DC, SEPTEMBER 3, 1985

Printed for the use of the Committee on Small Business

U.S. GOVERNMENT PRINTING OFFICE
56-465 O WASHINGTON : 1986

I

COMMITTEE ON SMALL BUSINESS

PARREN J. MITCHELL, Maryland, *Chairman*

NEAL SMITH, Iowa
JOSEPH P. ADDABBO, New York
HENRY B. GONZALEZ, Texas
JOHN J. LaFALCE, New York
BERKLEY BEDELL, Iowa
HENRY J. NOWAK, New York
THOMAS A. LUKEN, Ohio
IKE SKELTON, Missouri
CHARLES W. STENHOLM, Texas
ROMANO L. MAZZOLI, Kentucky
NICHOLAS MAVROULES, Massachusetts
CHARLES HATCHER, Georgia
RON WYDEN, Oregon
DENNIS E. ECKART, Ohio
GUS SAVAGE, Illinois
BUDDY ROEMER, Louisiana
NORMAN SISISKY, Virginia
ESTEBAN EDWARD TORRES, California
JIM COOPER, Tennessee
JIM OLIN, Virginia
RICHARD RAY, Georgia
CHARLES A. HAYES, Illinois
CATHY (MRS. GILLIS) LONG, Louisiana
TOMMY F. ROBINSON, Arkansas

JOSEPH M. McDADE, Pennsylvania
SILVIO O. CONTE, Massachusetts
WILLIAM S. BROOMFIELD, Michigan
ANDY IRELAND, Florida
JOHN HILER, Indiana
VIN WEBER, Minnesota
DAVID DREIER, California
D. FRENCH SLAUGHTER, JR., Virginia
JIM KOLBE, Arizona
WILLIAM W. COBEY, JR., North Carolina
ROBERT C. SMITH, New Hampshire
HOWARD COBLE, North Carolina
JOSEPH J. DioGUARDI, New York
JAN MEYERS, Kansas
DEAN A. GALLO, New Jersey
J. ALEX McMILLAN, North Carolina
JOHN E. GROTBERG, Illinois

MAJOR L. CLARK III, *Staff Director*
THOMAS G. POWERS, *General Counsel*
LOIS LIBERTY, *Publications Specialist*
CHRISTINE A. RUSSELL, *Minority Staff Director*

SUBCOMMITTEE ON ENERGY, ENVIRONMENT, AND SAFETY ISSUES AFFECTING SMALL BUSINESS

CHARLES W. STENHOLM, Texas, *Chairman*

CATHY (MRS. GILLIS) LONG, Louisiana
RON WYDEN, Oregon
NORMAN SISISKY, Virginia
ESTEBAN EDWARD TORRES, California

WILLIAM S. BROOMFIELD, Michigan
WILLIAM W. COBEY, JR., North Carolina
ROBERT C. SMITH, New Hampshire

JOHN A. HAUGEN, *Subcommittee Staff Director*
ANTHONY J. POWELL, *Minority Subcommittee Professional Staff Member*

BEST COPY AVAILABLE

CONTENTS

	Page
Hearing held on September 3, 1985	1
Opening statements of:	
Smith, Hon. Robert C., a Representative in Congress from the State of New Hampshire	4
Stenholm, Hon., Charles W., chairman, Subcommittee on Energy, Environment, and Safety Issues Affecting Small Business	1
Testimony of:	
Dunbar, Gary A., senior vice president, Camp Dresser & McKee, Inc	119
Flax, Louis, president, Lopat Enterprises, Inc., Asbury Park, NJ	9
Fortuna, Richard, executive director, Hazardous Waste Treatment Council, Washington DC	4
Hirschhorn, Joel S., senior associate, Office of Technology Assessment, Washington, DC	47
Schafer, Carl J., Jr., Director, Environmental Policy, Office of Assistant Secretary of Defense, Acquisition and Logistics	98
Schreiber, Robert J., Jr., director, Division of Environmental Quality, State of Missouri, Jefferson City, MO	60
Skinner, John, Director, Office of Environmental Engineering and Technology, EPA, accompanied by William Hedeman, Director, Office of Emergency and Remedial Response, EPA, and William Cawley, deputy director, Hazardous Waste Engineering Research Laboratory, Cincinnati, OH	19
Trezek, George, professor, Department of Mechanical Engineering, University of California, Berkeley, CA	13
Welsh, James Neal, chief executive officer, Shirco Infrared Systems, Inc., Dallas, TX	77
Additional material supplied for the hearing record:	
Dunbar, Gary A., senior vice president, Camp Dresser & McKee, Inc.: Prepared statement	123
Flax, Louis, president, Lopat Enterprises, Inc., Asbury Park, NJ: Attachment to testimony	11
Hirschhorn, Joel S., senior associate, Office of Technology Assessment, Washington, DC: Prepared statement	53
Schafer, Carl J., Jr., Director, Environmental Policy, Office of Assistant Secretary of Defense, Acquisition and Logistics: Prepared statement with attachments	100
Schreiber, Robert J., Jr., director, Division of Environmental Quality, State of Missouri, Jefferson City, MO: Prepared statement	68
Skinner, John, Director, Office of Environmental Engineering and Technology, EPA: Prepared statement	24
Welsh, James Neal, chief executive officer, Shirco Infrared Systems, Inc.: Prepared statement with attachments	82

APPENDIXES

A.—Material submitted by J.M. Huber Corp. for insertion in the record:	
1. Cover letter to Hon. Charles W. Stenholm, chairman, Subcommittee on Energy, Environment, and Safety Issues Affecting Small Business	131
2. Letter sent to EPA	133
3. Memo discussing barriers to development and implementation of the AER	135
4. Press release from Missouri Department of Natural Resources	141
5. Independent laboratory report on the Huber AER at Times Beach	143

Page

B.—Material submitted by Illinois Environmental Protection Agency for insertion in the record:
1. Letter to Charles W. Stenholm, chairman, Subcommittee on Energy, Environment, and Safety Issues Affecting Small Business 181
2. Letter to EPA 182
3. News release concerning State promotion of mobile waste incinerator ... 183
4. Publication entitled "Progress" 185
C.—Correspondence from IMPACO, Inc., concerning experience with EPA and IMPACO's patented innovative waste cleanup system 192
D.—Prepared statement of J. Robert Nicholson, vice president, Zimpro, Inc 200

BEST COPY AVAILABLE

SUPERFUND INNOVATIVE CLEANUP TECHNOLOGIES

TUESDAY, SEPTEMBER 3, 1985

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON ENERGY, ENVIRONMENT,
AND SAFETY ISSUES AFFECTING SMALL BUSINESS,
COMMITTEE ON SMALL BUSINESS,
Washington, DC.

The subcommittee met, pursuant to notice, at 2 p.m., in room 2359-A, Rayburn House Office Building, Hon. Charles W. Stenholm (chairman of the subcommittee) presiding.

OPENING STATEMENT OF CHAIRMAN STENHOLM

Mr. STENHOLM. The hearing room will come to order.

I would say first, good afternoon to all of you here.

This week, as Congress reconvenes, we are faced with the great challenge of effectively and responsibly reauthorizing the Superfund Program by the close of September. I am sure that all of us in Congress hope that an expanded program will make the Superfund law more responsive and effective than it has been in the past.

However, we should not merely expand the program; we should expand it in a way that reflects our acknowledgement that the problems associated with hazardous wastes will be with us for many decades to come.

We are here today to discuss the new and emerging cleanup technologies that I and many others think can achieve a long-term effectiveness in treating the toxic wastes that endanger the future of our health, environment, and economy.

As chairman of the Subcommittee on Energy, Environment, and Safety Issues Affecting Small Business, I have called this hearing to explore the potential that technology, innovation, and entrepreneurship can provide the permanent solutions needed to effect a cleanup of the Nation's uncontrolled toxic waste sites.

Since the Superfund was created by Congress in 1980, we have all too often seen inefficiency and ineffectiveness in the program's planning and administration. Cleanups have too often consisted of removing and redistributing wastes, not treating them full scale.

We need to step up our use of more sophisticated means of treating these wastes. We need to move away from the practice of removing and redistributing wastes, and instead begin to speed up the practice of testing and implementing methods and technologies that will detoxify, destroy, or recycle these wastes.

To those who are familiar with this issue, and that includes the many experts who will testify this afternoon, it is no surprise that a great deal of these innovative technological solutions exist.

In fact, the amount of innovation taking place is tremendous. However, the developers of these technologies, who are often entrepreneurial individuals and small businesses, have encountered a regulatory structure that makes it extremely difficult for them to demonstrate and market their technologies.

Many of these developers have essentially been denied competitive access to this critical market because their innovative technologies by definition are proprietary; that is, they are owned or licensed by a private enterprise.

As a result, these technologies are not generically or commercially available on a widespread basis, even though a number of studies assert that many of these technologies could provide long-term solutions that many generically available technologies cannot.

The end result has been that these innovative proprietary cleanup technologies have almost totally been excluded from consideration in the Superfund Program. Unfortunately, the economic frustration many of these companies have felt is threatening to drive them from the business. Consequently, the innovators we so desperately need may cease to innovate due to a state of regulatory and economic paralysis.

In an attempt to correct this unfortunate situation, I have introduced a bill, H.R. 3211, which will expand the range of permanently effective cleanup technologies, and which will provide a better working and testing environment for the small developers of these technologies.

H.R. 3211 creates a detailed process by which EPA is to evaluate, demonstrate, and implement such technologies, either under field conditions at actual national priority list sites, or by offsite treatment of wastes from such sites.

Moreover, H.R. 3211 would establish an Office of Demonstration within the Office of Emergency and Remedial Response at EPA to administer this program to test and demonstrate innovative technologies.

The bill also creates a sequence by which these technologies are to be reviewed and tested. Within this setup, EPA would evaluate applications that have been submitted by developers seeking to demonstrate their technologies.

EPA would also be required to choose appropriate Superfund sites to serve as locations of demonstration projects. In conjunction with a developer whose technology is to be demonstrated, EPA would be required to establish a detailed plan for carrying out the project.

EPA would then supervise each project. These projects are to be carried out by the company which has developed the technology, and EPA is to ascertain that the work being done is acceptable.

Finally, EPA is required to evaluate the demonstration project to determine if the technology works, and to find out how applicable the technology is to other Superfund sites.

Another strong suit of H.R. 3211 is its schedule of timetables for EPA to follow in reviewing and evaluating technologies in this

process. While some may argue with the idea of timetables, I see them as necessary in this case.

The developers of these technologies, who have put years of work into getting their ideas through the research and development stage, deserve a reasonable amount of time in which they know their technologies will be reviewed and tested by EPA.

With the schedule created by the workable timetables in this bill, the companies and individuals in the hazardous waste treatment industry will now be able to make sensible business and investment decisions regarding their technologies.

One other key feature of H.R. 3211 is that it acknowledges that the future of long-term, permanent solutions to the Nation's hazardous waste problems exists in the American business community. Entrepreneurial individuals and small companies seeking to compete in an open market will, if given the opportunity, develop and carry out the methods that are able to manage the hazardous waste problem long term.

In creating a more equitable situation for private industry, however, my bill does not create a handout or set-aside for industry. H.R. 3211 puts the impetus on the developers of innovative technologies to submit significant technical and economic data to EPA in their applications, and to provide the bulk of the funding to carry out these projects.

For those companies and individuals unable to cover all of their own expenses, H.R. 3211 provides them with access to Federal loan guarantees, a program EPA has experience in administering under the Clean Air Act.

Moreover, H.R. 3211 places the Office of Demonstration under the Superfund Office at EPA. This is extremely important to developers seeking to have their technologies tested and implemented, because the Superfund Office, specifically the Office of Emergency and Remedial Response, is where decisions regarding response action contractors are made.

Thus, technologies that may prove suitable for testing and implementation under the Superfund Program should be reviewed by that same Office.

I expect to hear all of these issues discussed today by the experts who are taking the time to testify. Obviously, the bill is not final right now. I plan to make necessary changes and revisions after I have time to take in the wide range of testimony we will hear today.

I look forward to hearing this key topic discussed thoroughly because, regardless of whether all of us here agree on every aspect of this issue and this bill, I know we all share the desire to maximize the effectiveness of the Superfund Program. It is my hope that innovative technology development, testing, and demonstration will prove to be a key step in that direction.

I would like to thank everyone for appearing today. I am sure this will be an informative and useful couple of hours for all of us.

I specifically want to thank my colleague, Mr. Bob Smith of New Hampshire, for coming back 1 day early to join us in this hearing, and will defer to him for any opening comments that he might have.

OPENING STATEMENT OF HON. ROBERT C. SMITH, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW HAMPSHIRE

Mr. SMITH. Well, thank you very much, Mr. Chairman. I commend you for your leadership in this area in drafting such legislation. I strongly support the hearing and certainly look forward to the testimony of these gentlemen.

I believe that if we are going to be successful in toxic waste cleanup, it is going to have to be a partnership with EPA and business, and not a confrontational situation.

So, I really look forward to hearing your testimony. Hazardous waste contamination has created significant problems in my own area, in rural areas of the Northeast, in New Hampshire. My State has 13 sites on or proposed for addition to the Superfund's national priority list, 11 of which are in my district.

A recent OTA report on the Superfund shows that EPA is heavily relying on removal of contaminants to RCRA permitted facilities or containment barriers as methods to clean up hazardous waste sites.

These practices, I believe, exacerbate the extent of that hazardous waste contamination problem in this country, in effect, creating new sites. The OTA report argues that permanent cleanup technologies would in the long term be more cost effective and provide greater protection in the long run.

So, I am anxiously looking forward to your testimonies, and hopefully, you will have all the answers for us. Again, I would like to commend the chairman for his leadership in this area.

Mr. STENHOLM. At this time, we will call our first witness. First, we would like to call Mr. Richard Fortuna, the executive director, Hazardous Waste Treatment Council, Washington, DC, and Mr. Louis Flax, president, LOPAT Enterprises, Asbury Park, NJ.

I would like to publicly thank you, Mr. Flax, for being here today. I know you have been ill and I think the fact that you are here is indicative of your interest in this subject. We appreciate you testifying today.

Mr. FLAX. Thank you.

Mr. STENHOLM. Please proceed.

TESTIMONY OF RICHARD FORTUNA, EXECUTIVE DIRECTOR, HAZARDOUS WASTE TREATMENT COUNCIL, WASHINGTON, DC

Mr. FORTUNA. I appreciate the opportunity to testify, and welcome your interest, as well as Mr. Smith. I do not have a prepared statement for the subcommittee at this time, due to the timing of the hearing and the fact we haven't got full feedback from a number of members, but will be submitting that in the next few days.

But I do have a few comments to present to the subcommittee this afternoon.

The Hazardous Waste Treatment Council, as I think most of you know, is the largest trade association of commercial hazardous waste treatment and management firms and equipment manufacturers. The members of our council are distinguished by their common commitment to the primary use of treatment technology

BEST COPY AVAILABLE

and the restricted use of land disposal in the management of hazardous waste.

Our 40-some-odd firms have facilities in 48 States, and we were the lead industry group in the reauthorization of RCRA last year which established a proscriptive system for restrictions on land disposal, the closing of many regulatory loopholes.

In that vein, we were one of the sponsors, along with the former chairman on this subcommittee regarding the establishment of a provision on research and development and demonstration under the RCRA Program which we think is going to be a very important and meaningful provision in the context of RCRA.

What I would like to do first before we go through the elements of H.R. 3211 is to put this issue in a little perspective relative to the larger issues of Superfund reauthorization and go through some of the pros and cons of the other basic approaches to this issue that are not embodied in H.R. 3211.

Essentially, this is a subset of a much larger issue. The issue is not whether we need to get new and innovative technologies used at Superfund sites, it is the substance of—a larger issue really is how do we get any technology used in Superfund sites?

To a large extent, the primary, and one could almost say exclusive approach to Superfund sites these days is redisposal or capping of slurry wall containment. That is indeed a known technology. It has a number of shortcomings. I think the problem we have had at Superfund sites is we have been dancing with the devil, we know, rather than trying anything else out.

Frequently, there have been references to the fact we at least know the retention life, so the containment probabilities of Superfund containment efforts. We also know what their shortcomings are, too, and there have been significant barriers to the use of known technologies or demonstrated technologies, such as mobile incineration units to insure that these methods are used as well.

I think one of the things we have to keep in mind is that everything that isn't a hole in the ground, everything that isn't a surface should not automatically be lumped into the category of new, innovative or demonstration.

It might be new in terms of its application, but is not new in terms of its being a demonstrated or known technology.

I think we are seeing the policy that is beginning to emerge to be put in place, this umbrella type of policy, that will make this type of bill that much more workable, and then that is in the context of H.R. 2871, the House Commerce Committee CERCLA reauthorization bill establishes such a policy to say where the Administration has evaluated a technology, and where he makes a finding that it will yield a permanent and significant decrease needed toxicity volume or persistence or mobility of the waste involved, he then must select the use of that technology.

Also, EPA's recent offsite policy in terms of how they are going to manage the wastes that are taken off the Superfund site issued May 7, makes many significant strides and reiterates that basic policy, although we have yet to see any specific sites that have benefited from this policy.

If I am not mistaken, isn't the McKin site in New Hampshire, the Superfund site, is that one you are thinking of in particular?

Mr. SMITH. That is in New Hampshire—McKin.

Mr. FORTUNA. I think it is in Vermont. I am from Michigan originally. But I think the McKin site is a good case study of what is happening under Superfund right now and how this umbrella policy in conjunction with the elements of H.R. 3211 can help to redress that.

There is a site there that has very significant concentrations of volatile or organic materials and it is 1 of—if not 1 of the top 10—1 of the top 25 sites in the country, of which a number of technologies were evaluated for the management of this material. The community said we think we support thermal destruction, and several bids were put in assessing and verifying the technological feasibility and indeed the cost effectiveness of incineration of these materials and instead what was chosen was aeration.

The community there is obviously very upset. It was a rarity to even get a community to accept that kind of remedial response, in terms of incineration response, yet indeed everything right now is so skewed toward the use of some land disposal method, as opposed to the more effective lease-cost approach, we get the same theme.

Now, in terms of how we implement this larger policy under the RCRA, with a research and development component, I would like to go through a couple of approaches that we think do not merit further consideration. The first would be the so-called underwriters laboratory approach, which would be similar to establishing what would be an underwriters laboratory, an independent, separate body that would say take a technology, see whether it works on a specific range of waste, and then render the determination on an independent basis.

I think that type of approach is fine where you are using standard consumer products or trying to verify the repeatability or reproductability of a given test protocol, but where you are trying to use a given technology on a whole range of sites that differ on a case-by-case basis, I don't think there is any way you can standardize that sort of evaluation process.

Another approach that has been used and which is in H.R. 2817, the Commerce Committee's CERCLA reauthorization bill, is the so-called university research center approach. On its face, I think that is certainly a responsible approach, one that relies on university research centers much in the same way we have energy research centers and whatnot. I think that has some merit. It certainly is not frought with some of the same shortcomings of the underwriters laboratory approach, whereby even if underwriters labs said this is fine, EPA is still the ultimate judge and jury over whether this technology works at this particular site. The underwriters lab is another kink in the pipe.

The university research centers, I think, suffer from another problem. That problem would be the fact that if you simply designate universities or academic settings as the basis for testing or trying out new technologies, I think you may have more emphasis on the theoretical than the practical.

Most of the people that I am aware of, such as Mr. Flax and many other individuals, are not university researchers or university based, they are practical people, they are people who have a practical knowledge of the types of sites and situations that need

responses, and I think that the university research centers approach as currently embodied in H.R. 2817, may suffer from more of an emphasis on theoretical—what might be neat to some academician as opposed to what is needed in the eyes of somebody who is out there and knows how sites need to be responded to.

And the last approach is the supervised field test approach, which is my short-term way of summarizing the components of H.R. 3211. What really needs to be addressed in this context, I think, is two things. First, is there needs to be a dedicated Agency focus. There needs to be a dedicated program presence to evaluate these technologies. Not to grant somebody a right to the marketplace, not to simply alleviate barriers to entry, but to make sure somebody is there and it is going to be evaluated on an objective basis, and second, to give a field demonstration.

I think not only to have a program presence but to actually get out in the field and try your technology at a specific site. Not to see whether it worked in the context of the underwriter laboratory, not to see whether it is useful in an academic setting, but actually get out on specific sites and try it out at sites that may be reflective of a larger or broader scheme of Superfund problems.

In that vein I think H.R. 3211 addresses those particular needs. I think the establishment of the Office of Demonstration is perhaps the most critical and important component of the bill.

Regarding the application process, I think it should also be made clear that these are the sites that are designated for demonstration only. As the bill reads, it could be interpreted to say that a site is designated only for demonstration. I think it should be made clear that demonstration could occur at only a part of a site as opposed to all of the site. I think a particular community that may have a demonstration technology coming in may be somewhat disquieted by the fact that this is a strictly experimental technology being applied to the whole site. To get a good field test or demonstration I don't think means you have to have the whole site addressed.

In addition, I think it would be useful to say that we like the fact that the bill does not say—does not skew the selection process toward nonprofit institutions, as some of the other bills in this area have, or toward academic institutions—it simply says any person, including a small business. I think that is a sound approach and alleviates the bias toward use of mechanisms or institutions that may not have as much direct knowledge of these site specific situations.

I think it was also a good idea to add some discretion to the minimum of sites that are selected. I mean simply saying the administrator must select 10 per year. He may have 20 one year and the next year only 3. I think that was a wise modification or wise component.

I think the timetables are a good idea, particularly I think the timetables are more important on the front end than on the back end. The completion and evaluation timetables may need to have a little more discretion in terms of how long it takes to complete the demonstration and how long the Agency has to evaluate the merits of that demonstration. In an incineration case, for instance, maybe 60 days is suitable. I think for somebody like Mr. Flax who has a

containment or incapsulation method, it may take a little bit longer to truly evaluate the merits of that particular technology.

I think it is also very good to make the component of the NCP to really institutionalize this as an approach to dealing with Superfund sites. On the other hand, I think that component of the bill is somewhat weaker than H.R. 2817 in that it only encourages the selection of technologies as has been demonstrated as opposed to saying the Administrator must select once he has made a number of discretionary determinations in favor of the use of a techology.

And, last, I think it is the money components of the $1 to $2 million as well as the loan guarantees. We certainly support and probably would say you need a little more than the $1 to $2 million, maybe something on the order of $10 to $15 million. In the final analysis the money to most people is of lesser importance than the program presence and the opportunity to demonstrate.

As you say, Mr. Chairman, these are not people looking for a handout, they want a chance to get a trial once and for all. They are not looking to make the 45 player cut, they just want a chance to get in the game, and show that they can do the job.

And one additional point: The bill has a component that says proprietary technologies are not to be excluded. That is sound. By the same token, I think there has to be a process by which proprietary technologies are not black boxes. We have a process under the Toxic Substances Control Act where people, chemical manufacturers will submit business confidential chemicals for evaluation and there is a confidential business process established for that. Somebody has to know how these processes work. We just can't be taking the word of an individual that this works this way, therefore it is good, and by the same token, we can't have that published in the Federal Register so the next guy coming along can piggyback on someone else's innovation. Somebody at the Agency, if there is going to be one, should be charged with making the decision. They, too, have to know how this technology works.

In summary, Mr. Chairman, I would simply say that what we really need to do and what we think H.R. 3211 does, is put the program resources where the Agency's mouth is, and where all the rest of our collective mouths have been. We need to use more technologies, we need to not only use those technologies that are demonstrated but get a real feel, honest field trial, for those things that are definitely new.

As I say, the money is less important than the opportunity to make sure that these demonstrations occur, but by the same token, we must ensure that the Administrator has the proper discretion to establish barriers to entry to this field. This is not any other small business or large business venture, it is public health that is in the balance. When that occurs, the Administrator's discrimination to make determinations on that basis or restrictions on that basis cannot be unfettered.

Thank you very much, Mr. Chairman.

Mr. STENHOLM. Thank you.

Mr. Flax.

BEST COPY AVAILABLE

TESTIMONY OF LOUIS FLAX, PRESIDENT, LOPAT ENTERPRISES, INC., ASBURY PARK, NJ

Mr. FLAX. Mr. Chairman, if I may introduce to the panel Dr. George Trezek from the Department of Mechanical Engineering, University of California, Berkeley. Lopat engaged Dr. Trezek several months ago to help us in an R&D project for a State Superfund site in California, and through his efforts, we were able to bring it to a successful conclusion.

I have a short statement that I will read, and then I would like, if time permits, to have Dr. Trezek expound on this one particular incident.

Mr. STENHOLM. Your entire statement will be made a part of the record, and any summaries or additional comments will, of course, also be welcome.

Mr. FLAX. Yes, sir; thank you.

Mr. Chairman, I very much appreciate the opportunity to testify at today's hearing concerning the need to provide a mechanism within the Federal Superfund Program to demonstrate new cleanup technology.

There is a belief in this great Nation of ours that entrepreneurs who make available new, effective technology to satisfy a need in the marketplace will succeed. This is more a myth than a reality when it comes to new technology to clean up the Nation's toxic waste problems.

My company has, for several years, invested its own money in developing and demonstrating the effectiveness of a new, patented chemical treatment for some toxic chemical contamination problems. We are the first to admit that our technology is no different than any cleanup technology. There are always some uncertainties, and no single technology can solve all problems. For example, incinerating toxic waste may lead to some toxic air emissions and cannot be used on toxic metals such as lead. Certainly, it is clear that any use of landfills or just leaving toxic waste in the ground and capping it provides no assurance of long-term environmental protection. There is, you see, a double standard being used by EPA in its Superfund Program.

EPA is willing to accept some technical uncertainties for some cleanup technologies that it is familiar with or that sometimes are low cost. But when it comes to new technologies, EPA likes to emphasize how unproven they are and how there is no data to prove that they will work for a long time; say, 5 or 10 or 50 years. Let's face it, no cleanup technology can be shown to pose no uncertainties or zero risks forever. Some degree of fairness and reasonableness is needed.

In the past several years, my company has steadily obtained technical data to show how our products work effectively in specific cleanup situations. For example, it has recently been found to be completely effective in a job in California, which is a State Superfund site, involving material heavily contaminated with lead.

Through independent laboratory testing, our product was found so effective that the State of California could tell a company that once its material was treated with our product, the material would no longer be considered hazardous. Attached to the formal state-

ment is some of this technical data, which Dr. Trezek will expound upon.

In several other cases, our product has been used successfully by industry to decontaminate surfaces with PCB's on them, such as we have heard so much of lately at the White House and the Smithsonian buildings.

Our product was certified by the State of Massachusetts to effectively decontaminate homes with chlordane contamination.

We are hard at work trying to prove that we can also decontaminate dioxin-contaminated soil and to provide a means of safely encapsulating asbestos, both major problems around the Nation.

I could go on, but the most important point I want to make is that we have been unable to get either a chance to use or demonstrate the effectiveness of our technology at a Federal Superfund site. The myth is that EPA and its contractors are keenly interested in getting on with effective and low-cost cleanups. From our experience, this is not the case.

As a small company, we struggle not so much to prove that our technology works—we can and have done that—but to get people within the Superfund system to pay attention to us, to treat us fairly, and to be willing to just give us a chance.

We are proud that we have obtained a patent for our product and we see no reason why EPA should be prejudiced against patented, proprietary products.

Of course, we are in business to make money, and there is nothing wrong with that. So are the people who run all those landfills that are taking in Superfund cleanup wastes. A recent congressional study found that 87 percent of those landfills are in an unacceptable condition, with many leaking or likely to leak and become future Superfund sites. Yet they continue to get the business.

Why does EPA find it cost-effective to use technology that is proven not to work and at the same time ignore companies such as ours?

I strongly endorse the legislative initiative of this committee to set up a demonstration program for new cleanup technologies. I am willing to compete in a fair marketplace. Small companies such as ours clearly need the wise assistance of the Congress to make the American free enterprise system work the way it is supposed to.

We seek no subsidies or handouts, just a chance to prove that our product works. If your bill becomes a reality, we may get that chance.

Thank you, gentlemen.

[Mr. Flax's attachment to testimony follows:]

ATTACHMENT TO TESTIMONY OF LOUIS FLAX, PRESIDENT, LOPAT ENTERPRISES, INC., ASBURY PARK, NJ

BROWN AND CALDWELL
ANALYTICAL LABORATORIES

LOG NO: E85-01-294

Received: 25 JAN 85
Reported: 28 JAN 85

Department of Mechanical Engineering
University of California
Berkeley, California 94720

ATTN: Mr. George Trezek

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
01-299-1	Top of East Control II	
01-299-2	K-20-No additive; South side of pile I	
01-299-3	K-20 W/Pozzalime II So. side of pile I	
01-299-4	K-20-No Additive II Top of East	
01-299-5	K-20 W/Pozzalime II Top of East	
01-299-6	K-20 W/Zeclite II Top of East	

PARAMETER	01-299-1	01-299-2	01-299-3	01-299-4	01-299-5	01-299-6
CAM Waste Extraction	01.26.85	01.26.85	01.26.85	01.26.85	01.26.85	01.26.85
Lead, mg/L	110	47	0.8	45	0.8	51

Soluble Threshold Limit Concentration as specified in the California Assessment Manual (1980), Criteria for Identification of Hazardous and Extremely Hazardous Wastes, Draft of January 11, 1984.

BROWN AND CALDWELL
ANALYTICAL LABORATORIES

LOG NO: E85-01-299

Received: 25 JAN 85
Reported: 28 JAN 85

Department of Mechanical Engineering
University of California
Berkeley, California 94720

ATTN: Mr. George Trezek

REPORT OF ANALYTICAL RESULTS

LOG NO	SAMPLE DESCRIPTION, SOIL SAMPLES	DATE SAMPLED
01-299-7	K-20 W/Pozzalime B III; Top of South	
01-299-8	K-20 W/Pozzalime B III; S. side of pile	
01-299-9	K-20 W/No Additive III; Top of South	
01-299-10	K-20 W/Pozzalime III;South Top	
01-299-11	South side of pile I	
01-299-12	South Top of pile III	

PARAMETER	01-299-7	01-299-8	01-299-9	01-299-10	01-299-11	01-299-12
CAM Waste Extraction	01.26.85	01.26.85	01.26.85	01.26.85	01.26.85	01.26.85
Lead, mg/L	0.7	0.8	85	0.8	130	120

James Hatfield, Laboratory Director

BEST COPY AVAILABLE

Mr. STENHOLM. Identify yourself again for the record, please.

TESTIMONY OF GEORGE TREZEK, PROFESSOR, DEPARTMENT OF MECHANICAL ENGINEERING, UNIVERSITY OF CALIFORNIA, BERKELEY, CA

Mr. TREZEK. Yes; my name is George Trezek. I am a professor of mechanical engineering at University of California, Berkeley. I am here to tell you about—give you an example of how some of this innovative technology in a small company helped to solve a major problem of a lead-contaminated site.

I was approached by a site owner who had a very bad lead contaminated soil problem and his waste stream was contaminated with lead. I heard about K-20 and other products made by Lopat Industries and so I decided that we would try some of these in our lab.

As it turned out, initial test results looked very promising and it turned out also that because small companies can respond quickly to changing formulations and fine tuning their product, we were able to fine tune this particular product to solve the problem at this particular waste stream.

And I think all this took place within, say, a matter of 6 months from the time the problem first came to our attention until the time we actually had a constructed system in place to deal with the waste stream. I think this is a tremendous example of how a waste stream can be, in fact, detoxified, considered as nontoxic after it has been treated with a product which has received very little attention on the open marketplace.

Mr. STENHOLM. Mr. Smith, do you have questions for these witnesses?

Mr. SMITH. Maybe just one, Mr. Chairman.

In listening to you there is obviously a sense of frustration. It just seems to me obvious that if you gentlemen, or anyone, had technology to break down toxic waste so that we wouldn't, in effect, have to create other sites, that we ought to be using it. I can't believe that it is a conspiracy to prevent it, obviously.

So what is the problem? Why haven't we gotten to this before now? Why are we at this stage now with Mr. Stenholm's and other legislation here? Why couldn't we get to it before this?

Mr. TREZEK. Well, in this particular case it was cheaper to essentially move it, to pass the problem on to somebody else. Everybody kept saying that this so-called new, innovative technology was just too expensive. It turned out after some fine tuning of the technology, the price is actually significantly less than you can actually haul it off the site.

So it can be treated economically and cost effectively. I think this was certainly a barrier to the person who was generating the waste stream initially until we could demonstrate the cost effectiveness of really treating the material.

Mr. SMITH. Do you feel that perhaps in creating the Superfund, which Congress did approximately 5 years ago, there was not enough thought given to what we should do with the waste at that time? Simply to the pressures of the immediate situation, basically sites that are causing ground water contamination and threat to

health, et cetera, and the pressures of that being brought to bear and the Congress created the Superfund to remove the waste from the toxic sites was just not carefully thought out? People not doing their job, EPA, businesses not responding in what——

Mr. FORTUNA. Having worked on Superfund in 1980 while I was on Mr. Dingle's personal staff when he was ranking majority leader, at the time I think everybody was so interested in getting a program established as opposed to worrying about all the jots and tittles of exactly how all this should work, a lot of things were just thrown in the Agency's lap.

And I think you have put your finger on the most fundamental issue here—the one I identified earlier as the umbrella issue. Let's just call it the test effectiveness issue which the original fund or Superfund, as it stands right now, unamended, drives the Agency to choose the least cost, technologically feasible solution, that invariably land disposal is feasible for just about everything and it is invariably the least cost.

So really to a large extent the Agency is not the—by no means the only or total villain here. The statute itself does not have the proper guidance and I think does not provide the proper backing for any administration, no matter how aggressive they might want to be, to pursue the use of permanent treatment technologies or to try new treatment technologies.

So that the most fundamental issue here, I think, is the need to redress that cost effectiveness test and then, in a manner, to ensure that once the Administrator has made certain findings relative to the permanency and the significance of the reduction in toxicity, that a technology can deliver, that he must select it.

He does not have to—we need to shoot for the most effective at least cost, not just least cost, and then see what we can get for it and that is how we have to change that equation around. We think H.R. 2817 will do that in its current form but I think we also then need this kind of approach to make sure those people who aren't incinerators or on pyrolysis, such as J.J. Huber out of Berger, TX, who have had a demonstration, those people have demonstrated don't have access under that approach because we have to provide for the dynamic changing nature in the way in which we are going to deal with technologies.

If, indeed, this is the policy of the EPA, we use treatment first and land disposal as a last resort, so, too, we have to reflect that in the development mode, too, not just development phase. So I think that is the most important issue here.

Mr. SMITH. Just one other question, Mr. Chairman.

Over the past 5 years that we have had the Superfund legisiation, if you could just characterize for me the extent of your frustration, if you will.

Have you literally tried to persuade EPA and others that you can do this thing a better way and it just has been falling on deaf ears or have you just basically ignored it and come forth now saying, hey, we can do it and, therefore, we are getting the type of legislation that the chairman is drafting or what exactly has happened in the last 5 years.

Mr. FLAX. I think I can give one example from my own personal experience. There was a recent publication entitled—EPA publica-

tion called "Practical Methods for Decontamination of Building Structures and Cleaning of Equipment at Superfund Sites."

This document is 200 or 300 pages thick. it was compiled by Potel Laboratory, PETCO Laboratory in conjunction with Naomi Barkley from the Cincinnati Laboratories.

It carries the normal disclaimer that even though we say it you don't have to believe it. We are 1 of the 21 methods in that book or in that document, yet EPA has yet to refer any situation and of the five case studies that they go into in the document, one took 5 years to clean up.

We could have cleaned it in 6 months with the same procedure at probably $3 or $4 million less cost. So I am thoroughly confused with the way EPA thinks. I can't give you an answer.

Am I a recommended method or am I not? Does the document mean anything or doesn't it?

Mr. FORTUNA. To build on that point, another problem is that the people responsible for evaluating this at EPA—it is very serendipitous.

John Skinner, who is going to testify later on—some people say waste proposals on dioxin and others—there is no one person to go to, no branch chief or whatever, who is responsible for saying yea or nay to these things like there is for every other program.

And I think that comes down to what H.R. 3211's key focus is; establishing a dedicated and accountable program presentation for the evaluations of new and innovative technologies.

There has to be somebody there who is accountable. If this is our policy, this is what we are going to go do. This is the law of the land. This is how we want to operate. Why in the heck shouldn't we have an office who actually carries that out and implements it?

It has to be there. And maybe some of the larger companies have the ability about wherewithal and the people to sort of slug their way through and track down the people in various corners of the agency that may have responsibility for technology X with waste Y, but other folks just don't have that.

When you are a smaller firm and you are just getting—having your first encounter with EPA, let alone having to break down all the barriers, I think it is even more significant.

Mr. SMITH. Are you in essence saying that you feel that perhaps EPA has been in your way rather than helpful in contributing to the limitation of toxic waste?

Mr. FORTUNA. No doubt about it. I think the first and foremost problem lays at the doorstep of the statute right now. It really just does, very directly I think, underwrite the use of least cost, technologically feasible methods because of the way in which the cost effectiveness test is structured.

On the other hand, it has been a very compliant player and has not been very compliant to try to get around those shortcomings and I think it took a little bit of trial and error to find out land disposal or recontainment in these situations has not worked.

It has taken some negative feedback to prompt the development of this onsite problem. I think the Agency has been supportive in H.R. 2817 of these proposals but at the same time I can cite to you the McKin site and there is the McCall site out in California where, again, there seem to be blinders on and all we are doing is

looking at redisposal of material that has enough inherent BTU value to be incinerated.

So I think we are in a transition phase right now and I think we are certainly beyond the point where the finger can just be pointed at the Agency or at the statute itself, first at the statute. And, I think, EPA also has to come across in the next few months to show they do mean business with this new policy, instead of putting on a nice-sounding policy, but not having any sites to back it up.

Mr. SMITH. Do you feel enthusiastically about every particular hazardous waste—you feel we can get every particular hazardous waste we have with some type of a chemical breakdown?

Do you feel we can do that?

Mr. FLAX. There is the technology out there for each one of them, I believe.

Mr. SMITH. For each one.

Thank you, Mr. Chairman.

Mr. STENHOLM. I will make an observation as a Member who was here in 1980 when the Superfund was first created. The Congress was responding to a perceived problem and had very few solutions.

I believe the Congress established a $1½ billion program at that time. In defense of EPA, I think that anyone who would be given that type of a charge would find it very difficult to respond.

That is precisely why we have suggested H.R. 3211 on the eve of Superfund II. We are now talking about a $7 to $10 billion program with some great amount of concern as to whether or not we are providing the Government with the mechanism to find effective cleanup technologies, with particular focus on small business' inability to compete under the rules we have created.

This is the concern and you have addressed that in your response to Mr. Smith's questions. I introduced H.R. 3211 because the hazardous waste problem has continued to worsen. Because wastes have been transferred and not properly treated, the problem is still with us. When I ran for Congress in 1978, the popular political position in the 17th District of Texas was to abolish EPA and OSHA.

I chose at that time not to take that position and I certainly believe that EPA plays a crucial role in dealing with these questions. Mr. Fortuna, you have already answered a big part of the question I was going to ask in your response to Mr. Smith, do you feel we are going far enough in H.R. 2817 to address the questions that you brought up? Mr. Flax, do you believe we are going far enough? I believe you expressed a reservation that the amount of money in the Guarantee Loan Lending Program might not be enough.

Are there any other reservations you have at this time about our suggested approach?

Mr. FORTUNA. Not really. I think I mean there is always little drafting suggestions and things of that sort, but I think in terms of the major policy calls and the way in which the section is structured, I mean there is some, I think, little more discretion needed on some of the deadlines or timetables there.

We have been a group that has been—come to be known as one that advocates proscriptive regulatory approaches in the RCRA context simply because you are dealing with a fixed number of technologies and a fixed list and universal waste.

BEST COPY AVAILABLE

One Superfund, however—I mean everything is very much case-by-case. The extent to which you can be proscriptive by statute in Superfund is far, far more limited. I think while we are very much in favor of legislative restrictions on land disposal, if you are under RCRA certain date decisions must be made. I think it is very difficult to legislate timetables for Superfund sites to be cleaned up and similarly I think one of the more significant problems is the timetables in the bill for evaluations of technologies.

I think there simply has to be a little bit more time and also I think the standard for the selection of those technologies that are demonstrated needs to more closely parallel the language of H.R. 2817. Other than that, I think H.R. 2817 in terms of its ability to stimulate and indeed bring about the use of not just the contribution of new technologies is quite sound.

I think there is a problem in terms of how the private parties may try to seek independent cost balancing tests to say it is too expensive to do this; therefore, we should not be able to do it.

I won't go into all the jot and tittle of that sort of Byzantine back alley of that profession, but I think other than that H.R. 2817 as it relates to new technologies and alternative treatment technologies is quite sound.

Mr. STENHOLM. I have one final question about something you touched on a moment ago. With regard to demonstration projects, communities will have concern about the testing of the unknown in their backyards, and this is going to be a real problem.

We have not addressed the liability question in our bill, but it is my intent to pattern this legislation after H.R. 2817. Would you have any comments, Mr. Flax, regarding the natural community resistance not only to demonstration projects but to the entire question of hazardous waste disposal or waste removal?

Mr. FLAX. Mr. Chairman, my first contact with EPA approximately 3 years ago, I was told before a panel of their people before they would address our formulation that a disclosure had to be made in order to prove that it was not a solution that was going to cause further problems, and under a secrecy agreement I so disclosed.

And the party from EPA's Superfund who reviewed it stated that it was exactly that—a safe solution. I believe that could be very instrumental in calming your local fears. I always make the statement that I think our formulation is so safe you can drink it, and I have.

Mr. STENHOLM. I have one final comment. A statement was made concerning the natural propensity to solve our hazardous waste problem by burying it. There is at least one bill in the Congress that would prohibit hazardous waste burial because of the associated problems we are seeing with the underground water supply. There is, and there should be considerable concern about what this practice is doing to our underground water supply.

Mr. Smith, do you have any further questions of this panel?

Mr. SMITH. Just one, Mr. Chairman.

As I am sure you are aware, there is another bill, the Torricelli bill, which is a similar piece of legislation to Congressman Stenholm's. Would you care to comment—I hate to put you on the spot

with the sponsor of the bill sitting here before you—but would you care to contrast the two in terms of likes and dislikes?

I think I essentially know the difference between the two. This one is more proprietary oriented for one thing, and probably more detailed, more timetables than Torricelli's and more specific, but I would be interested in your comments on that.

Mr. FORTUNA. Should I go first?

I think that H.R. 3211 eliminates—I think most directly addresses the need that we have which is to have a dedicated and accountable program present at EPA. The Torricelli bill is certainly a good bill, but we are not just talking about what is good.

We want to try to optimize this and make it as good as possible. In that vein I think Torricelli's bill in terms of stipulating an absolute minimum of sites with no discretion to go below that if a certain number of applications don't come in, the sort of use of samples or access to samples on demand, is a problem.

I think also the fact that the Torricelli bill does not afford the administrator enough proper discretion to choose to only do a demonstration on a portion of a site. A site is designated as a national demonstration site and I think the structure of this bill is much more closely attuned to allow a portion of a site to be designated for demonstration.

I think H.R. 3211 eliminates what I think is a likely perceived bias in favor of nonprofit or academic institutions, as is present in the Torrecelli bill.

Likewise, in going to the other examples I was trying to contrast some of the shortcomings of the profession in H.R. 2817. It is again a good approach. I think the only really, truly, fully unacceptable approach is the Underwriters Laboratory approach which none of these bills embody but that approach again I think if we are going to just say, look, we want to try to balance this competition between sort of academic institutions and how they might abuse it or tie up the money and the abuses that private entrepreneurs with tar buckets on wheels might have—maybe the best thing to do is funnel all this money through academic institutions and let them decide who should get grants or students to do demonstrations.

I think, though, that approach not only suffers from more the potential emphasis on the theoretical approach that an academic institution might have versus the practical, but I think it also is going to delay the process of getting these things tried, tested, and approved and out there working.

I mean you know every institution, whether it is academic, a trade association, or Congress, has its own bureaucracies and I think the more directly we can have this process tied to getting it tried at sites without putting more kinks in the pipes, the Underwriter's Laboratory or the Southeast Research Center or whatever, the better off we will be. EPA is still going to have to make the ultimate call on this thing and let's not add another kink to the pipe.

Mr. SMITH. Thank you.

Mr. STENHOLM. Thank you for your testimony today and we would like you to continue to provide input to this subcommittee as we deal with this issue from our perspective. While we do not have jurisdiction over this subject, it is our intent to work with the

Energy and Commerce Committee throughout the reauthorization process to attempt to create a more level playing field for small businesses in the belief that there are some answers there that can benefit all of society. We will welcome your further comments as we proceed. Thank you.

Mr. FLAX. Thank you, gentlemen.

Mr. STENHOLM. Next we would call Mr. William Hedeman, Director of the Office of Emergency and Remedial Response, EPA, and Mr. John Skinner, Director, Office of Environmental Engineering and Technology, Environmental Protection Agency.

Gentlemen, we welcome you to the subcommittee. We look forward to hearing your statements. Your written statements will be made a part of the record in their entirety. You may summarize or not as you see fit.

TESTIMONY OF JOHN SKINNER, DIRECTOR, OFFICE OF ENVIRONMENTAL ENGINEERING AND TECHNOLOGY, EPA, ACCOMPANIED BY WILLIAM HEDEMAN, DIRECTOR, OFFICE OF EMERGENCY AND REMEDIAL RESPONSE, EPA, AND WILLIAM CAWLEY, DEPUTY DIRECTOR, HAZARDOUS WASTE ENGINEERING RESEARCH LABORATORY, CINCINNATI, OH

Mr. SKINNER. Thank you, Mr. Chairman.

Mr. Smith, thank you for inviting us here today. I am John Skinner. I am the Director of the Office of Environmental Engineering and Technology at EPA. That Office is in the Office of Research and Development and today is my first day in that capacity.

I have been with the Agency for 13 years and for the last 3 years I have run the RCRA Program in the Office of Solid Waste. I personally am very committed to encouraging the use of innovative and alternative technologies in the Superfund Program and the RCRA Program and I know from my many discussions with EPA Administrator Lee Thomas, that he shares that commitment.

With me today, on my right, is Bill Hedeman who is the Director of the Office of Emergency and Remedial Response, which is the Office that does administer the Superfund Program; and on my left is Bill Cawley, who is the Deputy Director of the Hazardous Waste Engineering Research Laboratory in Cincinnati, OH.

It is a pleasure to appear before you today. I am not going to read my entire statement. I appreciate the fact it will be placed in the record.

I have some other information on programs that we have underway at EPA in order to encourage and assist small businesses in the hazardous waste field and I would like to make copies of that available to you as well. EPA is committed to a strong role for small business in Superfund and other program areas.

We have also initiated a variety of programs aimed at evaluating alternative and innovative technologies for hazardous waste management. We believe very strongly that developing improved methods of site characterization, sampling, and monitoring and encouraging the use of emerging and innovative technologies that treat, neutralize or permanently destroy hazardous wastes are critical to the successful implementation of the Agency's Hazardous Waste and Cleanup Program.

From my experiences in the RCRA Program and from my evaluation of conventional land disposal technologies, I have come to the conclusion that they are merely temporary solutions. By that I mean we will probably have to revisit sites where those technologies have been used some time in the future. In both the RCRA and Superfund programs we should use permanent solutions. We should use solutions that destroy or permanently treat waste so they are not hazardous.

Our general approach toward promoting the needed technologies is the following: First of all we have developed alternative technologies ourself. I will give you a couple of examples of where we have done that.

In addition to that we evaluate new concepts that are developed by others, test them, and then, based upon the results of our tests, we provided technical assistance and guidance. The information is provided to the private sector, to our own field representatives in our regional offices who are actually making the selection of technologies and to other governmental agencies, such as the Department of Defense.

In the early years of the program our emphasis was on building up the technological support to write regulations under the Resource Conservation and Recovery Act. With the changes in RCRA that took place last year where that entire program is moving toward alternative and innovative technologies, our research development and demonstration efforts have shifted as well. More recently we have emphasized evaluating and encouraging the development of alternative treatment methods that detoxify or destroy hazardous waste.

As you know, Superfund trust funds moneys themselves cannot be used for research and development, so we do our research and development under RCRA. But the technologies that we evaluate and that we develop under RCRA will have applicability at Superfund sites.

The key to the application of these technologies at Superfund sites—and this gets to a question that Mr. Smith asked the previous witnesses—is with respect to the cost effectiveness criteria in Superfund.

As I see from the bills that are before the various committees, including the administration bill, there is a shift in emphasis from short-term costs, or short-term costs savings, toward an emphasis on long-term effectiveness. I think that is a very good shift, and I think that shift in itself will create the impetus in the program for people to turn toward those technologies even though some of the more conventional technologies might be less expensive in the short term.

As I indicated before, we have developed innovative alternative technologies at EPA. One example is the mobile incinerator which destroys dioxin and other organic hazardous waste in soil. This was developed by Mr. Cawley's office and it is currently being used right now at Superfund sites in Missouri. We are going to obtain a tremendous amount of information from that evaluation. And we are going to use it at other sites as well.

Another example of technology that EPA developed is a carbon absorption technology which has been used to treat liquid waste

BEST COPY AVAILABLE

from Love Canal and now being considered for the Stringfellow site in California.

An important aspect of our demonstration activities is to provide others in both the public and private sector with the proper incentive to participate in the improvement and development of an alternative innovative technology. We think a cooperative approach combining the expertise of industry and Government is essential to solving large and complex problems at these waste sites.

We think an important thing that we can do at EPA is to evaluate these technologies and to put out a report or some sort of a document which describes their performance, and to do that in a very technically sound way with all the monitoring information that is necessary in order to demonstrate the effectiveness of the technologies.

We think if that happens, and if the Superfund bills are structured to encourage the application of longer term permanent cleanup technology, these technologies will be used in Superfund cleanups.

My testimony goes through a number of technologies that are available, that could be used and which appear to be very promising for evaluation and for use at Superfund sites. It also goes through the types of things that we plan to do in order to develop better site characterization and assessment techniques.

I am not going to read all of those lists to you, but refer them to you for your review, and we would be happy to try to answer any questions that you may have. We believe through cooperative Government, academic, industry efforts, substantial improvements can be made in both the efficiencies and effectiveness of various technologies.

And these are all consistent with the thrust of the administration's proposal, and the other several House and Senate proposals, to amend Superfund to encourage the use of emerging technology and provide more permanent solutions.

I know that you are interested in the manner in which we serve small business enterprises in the Superfund Program, and other programs across the Agency. Let me tell you that we do have in fiscal year 1986 a new research program which affects small business and it is called the Small Quantity Generator Research Program. The purpose is to reduce or prevent the generation of pollutants, and to establish research and demonstration projects concerned with the special needs of small businesses and people that produce small quantities of hazardous waste. Again, this program is being administered from Mr. Cawley's laboratories.

If you have any questions about that, we will be happy to try and answer them. Also, we have initiated a program which is somewhat similar to that proposed in H.R. 3211. Under this program, which we actually started this year, we will solicit proposals from industry on cleanup technology, technologies that have reached the demonstration stage.

We will provide assistance in developing an evaluation plan, and a quality assurance plan. We will work with various entrepreneurs in evaluating those technologies to ensure that the measurements, the calculations, the estimate and observations resulting from

those technologies can be compared, and we will publish the results of that evaluation.

The project report will contain the information necessary for use by EPA site cleanup managers and their consultants and contractors in evaluating these cleanup alternatives.

As I indicated, we initiated that project this year; we solicited and are currently in the process of evaluating abstracts for innovative technology proposals. This solicitation identified areas of innovative research at both conceptual and laboratory and field level. Over 130 abstracts were received and are currently being reviewed by our technical staff, and we will proceed with requests for proposals for evaluations in the future.

These programs and initiatives that we have underway are aimed at achieving the goals set out in H.R. 3211. And we support those goals.

We do, however, have several concerns about some of the ways in which the bill is currently structured. First of all, we do find it difficult to justify establishing a new office to try and consolidate the efforts now going forward.

We feel that we have in the Office of Research and Development, the authority and the program necessary to carry out these evaluation projects. And while I certainly feel that it is important for you to say that an office should be established for that purpose, I think you should leave to the Agency the organizational decision on how that office will be structured, and where it will be placed within the Agency.

As my testimony indicates, the administration is opposed to the use of loan guarantees, and I believe that is a matter of general policy. We, at EPA, are much more familiar with cooperative arrangements than loan guarantees.

I was not aware that we had a loan guarantee program under the Air Program. That is something I will have to go back and take a look at.

I know that my experience has been with cooperative arrangements rather than loan guarantees. And in the old days we used to call these demonstration grants where a majority of the funding would be put forward by the private sector and EPA would put forward a small amount of money mainly for the demonstration and evaluation of technologies.

I have actually run a Demonstration Grant Project Program, and am familiar with the operation of it. The Loan Guarantee Program for the most part would place a new administrative burden on the Agency, and would require skills and expertise beyond what I am currently familiar with.

Although we will go back and look at Air Program experience, as your opening statement indicates there may be some experience there that may be useful.

We also feel a number of places the bill is too proscriptive in terms of the timeframe and number of projects that need to be evaluated, and some timeframes are very, very tight.

We have had experience with innovative and alternative technology programs under the Construction Grant Program established under the Water Pollution Control Act, and we feel that you have

to provide flexibility in the timing and number of projects and we feel that should be built into this bill as well.

To summarize and conclude, Mr. Chairman, we share the subcommittee's determination to demonstrate new technologies for cleaning up Superfund sites. We are aware of the invaluable role of small businesses in meeting that goal. We feel we have programs underway that are moving in that direction.

That concludes my prepared statement, and we will be happy to try and answer any questions that you might have.

[Mr. Skinner's prepared statement follows.]

PREPARED STATEMENT OF JOHN H. SKINNER, DIRECTOR, OFFICE OF ENVIRONMENTAL ENGINEERING AND TECHNOLOGY, EPA

Good afternoon, Mr. Chairman and members of the Subcommittee. I am John H. Skinner, Director of the Office of Environmental Engineering and Technology within the U.S. Environmental Protection Agency (EPA). With me today are William N. Hedeman, Jr., Director of the Office of Emergency and Remedial Response and William A. Cawley, Deputy Director of our Hazardous Waste Engineering Research Laboratory in Cincinnati, Ohio.

It is a pleasure to appear before you this afternoon to discuss emerging and alternative technologies for Superfund cleanups, the role of small business in developing such technologies, and EPA's views on H.R. 3211 as it addresses these issues.

EPA is committed to a strong role for small business in Superfund, as well as its other program areas. We have also initiated a variety of programs aimed at evaluating alternative and innovative technologies in the hazardous waste area.

EPA and Small Business

EPA has underway a number of programs which deal with the special interests, concerns, and capabilities of small businesses, and we have established a Small Business Ombudsman and a Small Business Hotline. I would like to request permission to insert into the record some documents illustrating the scope of our programs and commitment in general, including: some issues of our "Small Business Update" showing our small business strategy and initiatives, our "Information for Small Businesses," which lists publications affecting small business, a presentation on "Small Business Assistance Programs at EPA," and "EPA Small Business Initiatives--Strategy for Improved Regulation and Compliance."

Encouraging Emerging and Innovative Technologies

To turn now to the issue of new technology, we believe strongly that developing improved methods for site characterization, sampling, and monitoring and encouraging the use of emerging and innovative technologies to treat, neutralize, or permanently destroy hazardous substances and wastes are critical to the successful implementation of the Agency's hazardous waste management and cleanup programs.

Our general approach to promoting the needed technologies is to evaluate new concepts, test them, and then provide technical assistance and guidance to the private sector and other governmental agencies in their demonstration and application. The use of Superfund sites for demonstration activities, in fact, could provide

EPA with an excellent opportunity to test emerging innovative technologies. Such technologies, once demonstrated, could have potential application at Resource Conservation and Recovery Act (RCRA) waste management facilities, as well as at other Superfund sites.

Current EPA Activities

We have undertaken a variety of research, development, and demonstration activities to facilitate management and clean-up efforts under both RCRA and Superfund. Under RCRA, much of our initial effort was focused on obtaining performance and design data on land disposal and incineration technologies. This information was needed to develop regulations for these technologies and to assist EPA regional and State personnel in writing permits for treatment, storage and disposal operations, and carrying out site assessments, and surface and groundwater sampling.

More recently, the emphasis has shifted to evaluating and encouraging the development of alternative treatment methods that will detoxify or destroy hazardous wastes. This includes innovative chemical, biological, and physical processes for treating hazardous wastes. While this research and development is conducted under the RCRA program, we anticipate that some of these processes will be applicable for onsite treatment of Superfund wastes. We feel there is a real opportunity to transfer the results of our RCRA research to help solve Superfund clean-up problems.

Under Superfund, our major past RD&D activity has consisted of field evaluations of technologies that have been used at Superfund sites. This has included, for example, evaluations of conventional onsite methods for containing hazardous substances using slurry walls. Such technologies are useful for certain purposes, but they do not treat wastes themselves, nor are they useful for decontaminating affected soil and groundwater. Other EPA activities have focused on providing technical assistance to onsite contractors, States, and EPA regional offices.

EPA has also undertaken efforts to develop, test, and demonstrate alternative and innovative technologies for use at Superfund sites. One example is the mobile incinerator which destroys dioxin and other organic hazardous waste in soil. We are currently testing the mobile incinerator at a Superfund site in Missouri to determine the feasibility and cost-effectiveness of the system.

Scope of Future Activities

EPA will continue to encourage field-oriented activities, i.e., activities which focus on testing and demonstrating technologies and characterizing sites, at individual Superfund sites. Our goal is to demonstrate the feasibility and desirability of innovative alternative technologies and encourage further development and use of such technologies by other parties, including private industry and responsible parties.

An important aspect of our demonstration activities could be to provide others in both the public and private sector with the proper incentives to participate in the improvement and development of alternative and innovative technologies. EPA believes that a cooperative approach combining the expertise of industry and government is essential to solving large and complex problems of waste site cleanup.

There are precedents for such cooperative work between the Agency and major regulated industries. Two examples are the efforts that have been undertaken with the Electric Power Research Institute to develop technologies for the control of SOx and NOx emissions from utility boilers and with the Health Effects Institute to assess the impacts of emissions from mobile sources.

The focus of cooperation should be to examine practical applications of state-of-the-art and new control technologies through their demonstration and evaluation at Superfund and other hazardous waste sites.

Demonstration and evaluation activities should be aimed at developing methods and protocols to provide answers to many complex technical problems. Improved methods and protocols for the following purposes would be very helpful:

* The definition of a sampling plan that accurately defines the boundaries of the contaminated area, thereby ensuring

the acquisition of representative samples and providing a true representation of the chemicals present and their magnitude;

* Determination or prediction of the extent and the magnitude of the degradation of surface water, subsurface groundwater, and the air;
* Estimating the rate of natural recovery of the site using biomonitoring methods and predictive models; and
* Evaluation of state-of-the-art technologies, new technologies, and combinations of technologies to ascertain practicality, efficiency, cost-effectiveness, and long-term reliability.

Information obtained from demonstration and evaluation of technologies would also help with policy and strategy related issues, such as:

* Determination of whether conventional strategies for site cleanup are appropriate and adequate, or whether new strategies are needed; and
* Assessment of the balance between natural recovery of the ecosystem and the need for intervention by EPA to speed the recovery process by initiation of cleanup activities.

EPA's experience with the mobile incinerator has demonstrated that any "idea" going to the field for the first time will need some interim development to make it work as intended. The "ideas" in the proposed demonstration and development program must be generated in a pilot scale environment to support

56-465 O—86——2

the field effort. This will serve to reduce the logistical problems and attendant costs of applying the new technology in the field.

I would like to conclude this phase of my remarks by mentioning some examples of emerging areas that we feel may be most promising for evaluation for use at superfund sites:

Emerging/Innovative Technologies

* Plasma arc thermal treatment
* Fluidized bed incineration
* Molten glass/salt reactor
* Membrane technology
* Supercritical fluid extraction
* Catalyzed wet-air oxidation
* Biological detoxification (surface and subsurface)
* Activated carbon
* Solidification
* Vitrification
* Biological treatment

Biology

* Biomonitoring (use of indigenous organisms to define extent of contamination, rate of recovery, resiliance of ecosystems)

Sampling and Monitoring

* Sampling matrix design based on statistical and data quality objectives

* Generic sampling plans employing physical, chemical, and biological parameters
* Groundwater/subsurface model validations (including development of rate coefficients)
* Generic analytical methods
* Screening models
* Analytical methodology advancements
* Geophysical monitoring protocols and generic monitoring techniques
* Groundwater sampling techniques
* Fiber optic techniques for monitoring
* Post-closure monitoring for technology reliability

These are some existing and possible activities aimed at bringing the benefits of alternative and innovative technologies to the cleanup of Superfund sites. They are consistent with the thrust of the Administration's proposals (as well as with several House and Senate proposals) to amend Superfund to encourage the use of emerging technologies to provide more permanent solutions to site cleanups.

Our current actions to clean up hazardous waste sites could be augmented by using certain targeted Superfund sites for demonstration projects. Through cooperative government, academic, and industry efforts, substantive improvements can be made in the efficiency and cost-effectiveness of various site assessment techniques, biomonitoring evaluation, and control

and cleanup techniques. Demonstrated improvements could then be better utilized at other sites, resulting in significant environmental and economic benefits.

Programs of Special Interest to Small Business

Through a new research program developed for Fiscal Year 1986, the Small Business/Small Quantity Generator Research Program, the Office of Environmental Engineering and Technology is developing and promoting the use of innovative technologies and management practices. The purpose is to reduce or prevent the generation of pollutants and to establish research and demonstration projects concerned with the special needs of small businesses and generators of small quantities of hazardous waste.

The results of this program should demonstrate practical, economical, and sound environmental solutions that can be used by small business to meet the requirements of State and Federal regulations. The program emphasizes non-regulatory means of encouraging the use of innovative techonologies and management practices to reduce pollution and provide economic benefits. Through the program, we are trying to foster a new Federal-State-private sector relationship that goes beyond the traditional regulatory framework and provides the three parties the opportunity to work together to solve small business environmental problems.

Although the program is new, it has a precursor in a cooperative agreement we developed with the State of North Carolina for the purpose of supporting RD&D technology

to aid small business. This three year project addresses hazardous wastes and toxics related regional issues, such as solvents generated by small businesses (which represent 35% of the total hazardous wastes generated in the State). We plan to institute another such State project in Fiscal Year 1986.

Alternative and Innovative Technology Evaluation Program

Perhaps of more immediate interest to this Subcommittee, our Hazardous Waste Engineering Research Laboratory in Cincinnati (HWERL) has initiated a program somewhat similar to that proposed in H.R. 3211. Under this program, we will solicit proposals from industry on cleanup technologies that have reached the demonstration stage. We provide assistance in developing an evaluation and quality assurance plan, and evaluations are executed under representative conditions. We will take care to ensure that the measurements, calculations, estimates, and observations resulting from the technology under evaluation can be compared with those pertaining to the alternative cleanup technologies.

We anticipate that the project will result in the evaluation of new technologies at three or four sites. We will not attempt an evaluation of the entire cleanup operation at any site. An EPA contractor will perform the evaluation of the selected cleanup technologies according to a well-defined specification,

which may be different for each technology under evaluation. The project report will contain information for use by EPA site cleanup managers and their consultants and contractors in evaluating full-scale cleanup alternatives.

HWERL is also currently evaluating a number of innovative techniques for cleaning up hazardous wastes. One, being evaluated by the University of Washington and to be demonstrated at a Superfund site, is the use of an electrokinetic system to remove pollutants from the soil. Another involves a freezing technique to decontaminate sludges and soils or to assist in the construction of liquid-tight walls.

We are also evaluating innovative ways to wash soil to remove contaminants. EPA is also now demonstrating the use of a mobile incinerator system for destroying contaminated materials on-site and will soon be demonstrating a mobile carbon regenerator. Further, we have conducted a demonstration of a method of isolating hazardous wastes by using a bentonite barrier to isolate them from the groundwater.

In Spring, 1985, HWERL initiated a program to investigate and evaluate innovative technologies applicable to the cleanup of Superfund remedial action sites by soliciting and evaluating abstracts for innovative technology projects. The purpose of the solicitation was to identify areas of innovative research at the conceptual, laboratory, and field scale.

Over 130 abstracts were received in the following areas: in-situ treatment technologies; containment technologies; waste storage technologies; and waste treatment technologies. The abstracts have been reviewed by our technical staff, and, based on the reviews, specific areas of in-situ and other waste treatment technologies will be targeted in coming months through requests for proposals (RFP's).

Based on the RFP's, projects will be awarded on both the laboratory and field scale level. We will make a major effort to select projects which are backed by previous successful research results and which show the greatest promise of success at the full-scale level. An economic evaluation will also be part of each project.

H.R. 3211

Many programs and initiatives that we already have underway are aimed at achieving the goals set out in H.R. 3211. We are concerned, however, that attempting to force these necessarily flexible, innovative processes into a rigid organization, processes, time schedules, and unfamiliar loan guarantee programs may retard our efforts. In addition, we feel that H.R. 3211 must be evaluated in light of the problems it would create for those living near the sites chosen for the application of innovative cleanup techniques.

Community Response

We have found that the support of the affected communities, as well as the general public, is a crucial element of any successful Superfund cleanup activity. Through development of a detailed community relations plan for each site, we have learned to be sensitive to the concerns and potential responses of the affected citizens. It seems likely that serious issues concerning the "experimental" nature of alternative and innovative technologies, particularly the safety, adequacy, and permanence of the remedy, will be raised.

Organizational Problems

We feel that we have managed to initiate a series of inventive programs aimed at demonstrating the feasibility of innovative technologies. We have also managed to involve small businesses in these activities. The organizational difficulties involved in supplanting our aggressive but flexible approach with H.R. 3211 could well delay the very program we seek to implement. From a purely managerial point of view, we find it difficult to justify establishing a separate office to try to consolidate the efforts now going forward. We already have the Office of Research and Development to carry out the demonstration programs. Any reorganization would probably entail a certain amount of confusion and delay.

Loan Guarantees

The Administration is opposed to the use of loan guarantees as proposed by H.R. 3211. Such guarantees are not necessary. They create contingent liabilities for the U.S. Government and obscure

the real effect on the economy of government actions. These concerns do not arise under the current method of promoting the demonstration of new and innovative technologies.

Difficulty of Administration

The last major concern about H.R. 3211 involves the administrative burdens it would place upon the Agency. The program would require skills and expertise beyond our current capabilities.

Further, the Bill is far too prescriptive with regard to the time frame within which each phase of a demonstration project must be executed, as well as the number of projects to be completed. The schedules seem to be unrealistic. For example, it is doubtful that all the necessary data for making a proper evaluation could be assembled in 60 days, let alone a credible evaluation be completed.

There is no way to be certain how many viable applications we would receive during the life of the program, so any attempt to specify the number of projects to be completed in each year (or even overall) must be considered as a target only. The Bill, however, refers only to "insufficient applications," not insufficient feasible applications as a reason for failure to achieve the required number of projects.

Taken together, the requirements as to number and timing of the projects ensure that compliance with the terms of the

Bill would be very difficult. In any event, it would be highly unlikely that quality results could be produced on the schedule given.

To summarize and conclude, Mr. Chairman, we share the Subcommittee's determination to demonstrate alternative and innovative technologies for use in cleaning up Superfund sites, and we are aware of the invaluable role of small business in meeting that goal. We are concerned that the provisions of H.R. 3211, instead of enhancing our ability to achieve our objectives, might disrupt and delay the efforts we have underway.

EPA has had previous experience trying to encourage the development of alternative and innovative technologies in the construction grant program under the Clean Water Act. That experience has convinced us that success is elusive in a field of financially risky projects dependent upon intellectual entrepreneurship. We fear that H.R. 3211 as currently structured would be an unfruitful attempt to impose structure on an inherently fluid, unpredictable process.

This concludes my prepared statement, Mr. Chairman. My colleagues and I will be happy to answer any questions you may have, either now or later in writing for the record.

Thank you for the opportunity to appear before you today.

Mr. STENHOLM. Will there be any comments from the other two gentlemen?

Mr. SKINNER. No; they are just available for questions.

Mr. STENHOLM. Mr. Smith.

Mr. SMITH. I don't have a question right at the moment, Mr. Chairman.

Mr. STENHOLM. There seems to be some confusion here. My bill was developed with the idea of being consistent with what you have expressed the EPA is doing and what I perceived this administration has been talking about now for 5 years—no Federal handouts, a faith in the private sector, a reliance on technology and American ingenuity, and a free enterprise solution to a significant problem.

Your testimony suggests to me that we are saying the same thing, except that you seem to be looking at H.R. 2817 as something that is completely 180 degrees away from the intent of the author in regard to this question.

On loan guarantees, you have already answered one of the questions, that you will go back and look in other areas. I believe you will find that in clean water and some other areas loan guarantees are, in fact, working very well. And at least this Member believes that loan guarantees are much more preferable to a direct grant.

I have witnessed what happens when Uncle Sam creates a big pot of money, and says, "We have got a problem out there, you all come solve it." There are a lot of folks who get in the business at that time.

And what we were hoping to do with this legislation is to provide the incentive to people who are already using their own money, and then if they come up a little short, then they can go to EPA. And I agree with you in total that EPA needs to have the flexibility to run the program to its maximum best interests.

But I am a little curious. In your testimony, and in some of your conclusions, you seem to be running in two different directions at the same time, and I would like to hear more of your comments on those specifics.

Mr. SKINNER. I think that our position is that we are fully supportive of the goals of your legislation, and we think that all of the features such as trying to get the private sector involved, trying to get the new technologies to be used, are something that we agree with wholeheartly.

With respect to the loan guarantees, I guess I haven't reached the conclusion that we are at the stage that any capital subsidization is necessary whatsoever.

I think that if we do provide opportunities for people to come and prove their technology, if we evaluate those technologies, and then if we encourage their use at Superfund sites, it might not be necessary to use any type of capital subsidy either through grants or loan guarantees.

I think we should have some experience with doing that before we conclude that some sort of loan guarantee or grant program is necessary.

Mr. STENHOLM. I have no problem with that logic. I would not expect loan guarantees to be made when they are not necessary. However, in many instances, and particularly because you object to

the concept of timetables, it is important to address a key problem of small business; dealing with the lack of a timetable by a bureaucracy.

And I say this with all due respect to all of us who are part of the bureaucracy and that includes Members of Congress as well as anyone else. Small businesses with limited resources face frustration and sometimes devastation when a key decision is made by someone in the bureaucracy, without any congressional or other oversight. I have had experience with this scenario in another department of government, the Department of Energy.

When such a situation exists shouldn't we have some timetable to help address such a problem? If we encourage small businesses to participate, which you have said you believe you are already doing, should we not have some type of protection? And, if not a timetable, then what?

Mr. SKINNER. I think EPA should act within a timely manner on any application they receive once all information is received from the applicant. To the extent that we have the resources to do that, we may have to set some priorities and look at the more promising projects first and others later, based upon the numbers that are in the queue and resources we have for that purpose. That is the reason I don't think we can pick a particular period of time as being the appropriate time for reviewing all applications.

I agree with you, I sympathize considerably with people that come in and are given bureaucratic redtape, and go for years and years and without getting a response, and I am not intending to administer the office that I have just taken responsibility for that way. but I don't think you can say 60 days or 90 days is a benchmark we have to use in all instances.

Mr. STENHOLM. But, if you have that timetable for a 60-day period, and you can't make a decision, at least you may have a justified argument. Any legislation would certainly take into consideration that EPA can't do the job during such a period of time because of the nature of the work, which is innovative, and because technology evaluation is not an exact science.

Mr. SKINNER. The data is new in a lot of instances, and a lot of times you don't have all the data you need initially. I think you need to build those sort of things into any timetable.

Mr. STENHOLM. That is exactly where we are coming from on this legislation. Small business cannot afford to leave that determination up to an administrative decision, without timetables or any reason to move quickly, especially when there is a bureaucratic situation.

I do not judge the sincerity of individuals who work for us in Government, and I question no one's sincerity or motives in anything that I am saying, but at the present time, no one of us has the answer to all of the problems that befall us. And yet under our system of government, we do have somebody who has to make these key decisions, and we do have a problem as a result.

I think we have got a heck of a problem right now as far as what small businesses are telling us. They are going to get out of business at a time when I think you are going to need them the most if we don't address this question.

Mr. SKINNER. I agree with you that we really should push forward innovative technology from entrepreneurs, and try to encourage their involvement in the program. And I think that will result in significant improvements in the program.

Mr. STENHOLM. Let me take a little bit more time and give you one example here.

The J.M. Huber Corp. of Texas spent $6 million developing its advanced electric reactor, a thermal destruction technology designed to treat dioxin and other hazardous waste. Huber spent about $750,000 to demonstrate the technologies at the dioxin-contaminated Times Beach site in Missouri, with which we are all very familiar.

The Missouri Department of Environmental Quality, headed by Mr. Schreiber, who will testify later, found Huber's demonstration of technology successful in November 1984.

However, when EPA went about selecting remedial actions at the Love Canal site in upstate New York, the Huber process was not considered, because, according to the contractor's responsiveness summary, commercially available technology to dispose of dioxin contaminants was 10 to 15 years away.

This misstatement was expressed even though Huber's technology was to be commercially available by midsummer 1985, or at the latest in early 1986.

Dr. David Stephan, Director of EPA's Cincinnati Hazardous Waste Engineering Research Laboratory, told the House Science and Technology Committee earlier this year that the Huber technology was commercially available.

In the EPA survey assessment of incineration treatment methods for liquid organic hazardous waste, EPA acknowledged that the advanced electric reactor offers an effectiveness far in excess of RCRA requirements.

However, despite all this seemingly good news about Huber the company is on the verge of getting out of the hazardous waste treatment business. Why? Because according to a company executive, Huber sees no return on investment foreseeable within the next 2 years.

Huber, like almost every other company with innovative technology, questions the commitment of authorities, especially the EPA, to implement long-term permanent solutions. So here we have a top company in the business, one which has proven the effective test of its technology, preparing to stop innovating because innovation brings about no economic benefits.

My question to you is, what can EPA do to convince me that it is doing what is necessary, from both the economic and environmental standpoint, given this well-documented scenario that Huber and other firms have encountered? How can EPA possibly be opposed to the concepts that are in our bill?

Mr. SKINNER. I don't think we are opposed to the concepts in your bill. In fact, I think we are supportive of the concepts in your bill. I don't know why Huber technology was not used in Love Canal.

Mr. HEDEMAN. Let me react to that. I guess it gets to the issue that some of the questions and some of the statements of the witnesses are skirting around. Conceptually, I think everyone agrees

that, to the extent possible, we should pursue as many alternative technologies as is possible.

The issue it seems to me comes down more to implementing them, not pursuing them but implementing them. And I think that is where some dialog between the witnesses here, and the witnesses that you will have in the future, and yourself, may be more appropriate, because that gets to the issue.

Let's take the Huber situation. At the Love Canal site we did make a decision to excavate certain contaminated material that is in the creeks and sewers, I believe that is what they are focusing on, that has dioxin-contamination in it, as well as removing some dioxin contaminated sediments in the streams in Love Canal.

Our concern at that point in time, which was in the 1984-85 timeframe, was to remove from public exposure, through creeks and sewers or streams, dioxin-contaminated soil. I would like to have been able to represent that there were technologies out there we felt comfortable with that could incinerate that waste. They did not exist.

So, we have stored—we have not reached a permanent decision at Love Canal, but we intend to store that waste. This means that companies such as Huber may be in a position at a future point to bid on the incineration of the waste.

That comes down to, I think, the fundamental issue. As I read your bill, there will be opportunities, if it is enacted, for small businesses, or perhaps any business, to pursue their technologies through selected Superfund sites. There will be an opportunity for EPA to review them and essentially give some sort of good housekeeping seal of approval, or something to that effect.

But then the issue becomes it seems to me, how that small business is going to be able to implement that technology at future Superfund sites. Your bill does not pursue that issue, at least I am not reading it that way. I don't think it should.

Because, it gets into a very fundamental issue and that is that each Superfund site the Government cleans up will be done in the customary way of the Government procurement process. With that any procurement, that will require competitive bidding. I am not reading from any remarks that you are making that preferential treatment should be given to a small business through the competitive procurement process, because they happen to have received a good housekeeping seal of approval.

Indeed we do see in H.R. 2817 some signals that would encourage this type of thing, provisions for value engineering, for example, which are in H.R. 2817, may draw out some of these technologies at some of these Superfund sites. The issue is going to be who implements this approved technology.

I think that you will hear from some contractors a concern or hesitancy to pursue, if they come in with the lowest bid and get an award to clean up the site, any process that gets a good housekeeping seal of approval, because while it has been conceptually approved or reviewed, and received good, favorable approval, there is a concern that it is not a tried and proven technology over the years, and that the role potential for liability may be with those contractors.

I could go on for a variety of reasons and list what I think are major impediments to the delivery, the real issue that others may raise, but I really think those are impediments that collectively we may have a fair amount of difficulty getting around even though those technologies are proven. And it is not because EPA likes to put blinders on and ignore them, it is that the process through low bids, through competitive procurement itself, and basically the marketplace, is going to take us toward certain technologies that may perhaps embrace incineration, but not necessarily the Huber Co. to do the incineration.

Mr. STENHOLM. You were very perceptive in the intent of the author of this amendment. It is my intention to dictate who shall do the work and to give small businesses a fair shot at doing the work. Every day in the business world, small businesses develop new ideas and technologies but are incapable of delivering them with their own abilities. So what do they do? They enter into business, generally, then sell out, do whatever is necessary in order to capitalize on what they have developed. This is an everyday occurrence in the business world. And that is the intent of this legislation—to have that same definition and practice in the Superfund and in all of these areas.

And I do not argue with your concerns; I would have the same concerns. But I am reminded of Senator Glenn's statement as he sat in the spaceship, that he was proud that it didn't go to the lowest bidder. And I think the same thing can be said as we deal with this very serious problem of hazardous waste cleanup. No one wants it to go to the lowest bidder if the lowest bidder cannot deliver. That is a separate issue from what we are talking about today, though.

And there is not in our legislation, nor will you see it in this legislation, any stipulation that a set-aside of *x* percent must go to any small business. That would not be, in my judgment, helpful for the overall concerns.

Mr. HEDEMAN. The concern I am raising, as you write specifications for invitations for bids, one has to be continually mindful that you don't write them to such an extent that only one company can bid on them. That, if done, raises the opportunity time and time again for protest. Indeed, there have been so many cases before the General Accounting Office of bid specifications written so tightly that only one company such as, as an example, Huber, could bid on it, to the point where procurements are stopped.

So, I guess I struggle with the concern as to what will happen once a particular technology is approved in terms of whether it will ever be realized, in terms of implementation at future sites, particularly if that technology is equal or similar to other technologies which in the real world of competitive procurement are going to be competing with each other in terms of which gets the lowest responsive responsible bid.

Mr. STENHOLM. My last comment, and then we will have to move on, is that I accept the spirit with which you have made those last statements. I think we agree on a great number of concerns, but it seems to me and I don't think this is the way you intend for it to come out—that you are making an argument for the status quo.

Mr. HEDEMAN. No.

Mr. STENHOLM. I say I don't think that is what you are intending, but some would interpret it that way.

Mr. HEDEMAN. What we have been able to do, I think what does not come out in our testimony that directly, is to pursue these alternative technologies through our Research and Development Program that Dr. Skinner now heads. In the name of demonstration technologies, or through the development effort, the Agency is able to essentially select certain technologies for certain Superfund sites and try them out, and not necessarily be confined to the normal procurement practice that we must follow at most Superfund sites.

I guess the question I am raising to you is this. The approach that you have laid out here would be in lieu of an approach that accomplishes the same objective. The pursuit of alternative technology through a research and development program that is not tied in as tightly with the Superfund sites would be a suggested alternative. That would have the benefit of carrying it over, not only to Superfund, but also to the other major programs, much as the RCRA Program which the Agency administers so the benefits of technology for both programs can be realized.

I am just concerned, having managed the Superfund Program for 4 years, in fact, most of its time, that the delivery of technologies that would be approved by the Agency into real practice may not occur as rapidly as some may infer or feel should this particular bill come into being.

Mr. STENHOLM. But you would also be among the first to admit that our success story in the last 4 or 5 years has not met your own expectation.

Mr. HEDEMAN. Well, I think the remarks of Mr. Fortuna in terms of the statute are very telling. The fact is that EPA must select a cost-effective remedy, and the bias in the statute leans toward onsite remedies as opposed to offsite remedies.

The need to pursue cost recovery of any remedy we select against responsible parties all are factors that do not make this the normal type of Government program that is administered in regular circumstances.

Mr. STENHOLM. Mr. Smith.

Mr. SMITH. Just a comment. I think essentially, though, the crux of the matter, the bottom line, if you will, is that you have people out there, businesses out there, with the technology—not only the technology—as they stated, they feel they have the technology to break down any and all toxic waste that we have. They not only have the technology, they have the will, the desire to do it.

Just following up a little bit, I am a little concerned about perhaps you guys being a little bit defensive with the chairman's remarks regarding Huber. I think we want to work together on this. It is not unlike the situation in the space industry now where we have numerous businesses itching to get into space. We just need to come up with the system whereby we can get them there, to come back with the technology, to come back with the findings there.

I think it is the same thing here. I think we have it. I think it is my own interpretation over the last 4 or 5 years of Superfund. You have dealt with it one way, and I didn't mean to be critical of Superfund in terms of what you are trying to do in my previous re-

marks. That is, we have dealt with it one way; now we have got another way, which obviously is better. Let's work together on it instead of getting into a confrontation here.

I think we can deal with the competition with the bidder. That would be a nice problem to deal with. More importantly, let's get the technology up here, and lets get somebody accepted and go ahead with it. That is the most important thing. I don't think we should be so concerned about who is going to get the bid. Somebody can take care of that.

Let's just make sure we have got somebody who can bid and do the job. I think we have that. I just detected a little bit of defensiveness on the part of you in response to the chairman's statement regarding Huber. I think we have the technology. Let's use it. Let's put it to work. We will deal with the bidding process as soon as we get the people up here and put them to work.

Mr. SKINNER. We certainly do want to work with you in a cooperative way, and think through some of these issues with you. Just so I don't leave the wrong impression, there are many issues of the bill we think are very good ideas. These include: First, the idea of establishing a single point in the Agency where people can come to for an answer on the technologies; second, the requirement for EPA to evaluate these concepts when they are brought forward and come forward with a timely answer to someone so they are not left hanging; third, the fact that we would be required to write a report so that people would know how the technology performs; and fourth, the requirement to use that technology once that process is gone through.

Conceptually we agree with that. We may want to talk about some of the specifics in specific sections, but I didn't want to leave the impression we didn't think that was an overall good approach.

Mr. SMITH. One quick final point. Specifically, I was a little concerned about your defensiveness on the timetable approach. I personally think if a business comes forth and says they can do it, they can give you that technology by such and such a time or they can clean up that site in such and such a length of time, why not let them try it? What have we lost? So somebody is wrong by a month, 2 months, maybe a year, maybe 10 years, but if they say they can do it, give them a shot.

That is what America is all about. That is what the whole private enterprise system is all about. If we are wrong, we are wrong, but give them a shot at it. If they can do it, they say they can do it. Why not? I won't be concerned about that. We can always rewrite the timetables. It happens all the time in Government. We do it all the time, all of us.

Mr. HEDEMAN. The concern there has been more from experience in Superfund. If company X were to come forth with a new solution of some sort, and they felt that it would apply to a specific Superfund site, our experience has been that there are so many variables at that site that it may be impossible to meet that schedule.

For example, we would try out this new technology, and within a matter of days, the responsible parties would step in and say we want to take over the site and clean it up ourselves. That puts us back to square one requiring us to find another site. Now the concern is when you talk about schedules, that I think everyone in the

Agency wants to meet them. We have just had so many stops and starts because of variable situations that no one can control that it makes it somewhat difficult to meet them.

Now, it seems to me that some language could be crafted that deals with the fear of the unknown versus the desire for the known—yours being the latter.

Mr. CAWLEY. If I may comment on that point, since my laboratory is the place where the technical evaluations for most of this sort of material is done, our concern is with producing a report within 60 days.

The analytical chemistry that is done for these types of studies is such that if we can get the data, with all of the analysis for quality control and quality assurance done to begin to interpret in 60 days, we feel we have been very successful, particularly if we are dealing with something like dioxane where the analytical chemistry is very complex, just getting the data in 60 days is a major problem. Consequently, 60 days to produce a report of the significance and meaningfulness of the type that was suggested in the legislation is almost impossible for us to do.

My experience over the last almost 20 years with technology being presented to us is that the developers usually do not have all the data needed. To establish that within 60 days of the time company X produces an application or a plan that can be evaluated can be very difficult for us because we usually have questions about the data.

We could give a technical evaluation. We can give them a technical evaluation in 60 days, but it is very easy to say no and very easy to say we don't find the data here to support your claims. Those are the problems that I see operating with these very rigid timetables. But I certainly agree, having been on the private industry side and having suffered with bureaucrats who took forever to produce an answer on something I thought was very simple. I certainly think there should be some sort of constraint.

I don't feel the Agency should be in a position to simply dawdle around with somebody's application. But from long experience in this sort of thing, the numbers that are being proposed for these things are much too rigid for us to really produce a meaningful evaluation or produce a meaningful report.

Mr. STENHOLM. That was a very positive response, Mr. Cawley. That shows that you are open, and if that is true, then, I think those who are dealing from a small business perspective can agree on some more meaningful numbers. But the tenacity of the author of this amendment is going to be to force that to happen and not to allow the bureaucracy to dawdle indefinitely. If we are going to encourage small businesses or large businesses to make investments in helping you work on this problem, I think we are going to have to take it out of the field of bureaucratic uncertainty as much as we can, while admitting that this, too, is not an exact science.

But we have got to do better than we have done in previous legislation. That is what I heard you say, and put it in my own words. Mr. Smith, any further questions?

Mr. SMITH. No.

Mr. STENHOLM. We will have additional questions, and we appreciate your offer to work with us as we make changes to this legisla-

tion. Certainly, we can disagree when we might have to disagree, but I hope we can find ways to accomplish the overall goal. In your testimony, it sounded like we may have a few things that we can agree on at this point in time.

Mr. SKINNER. I think so.

Mr. STENHOLM. I thank you for your time today, and we will look forward to working with you as the day of action on the floor of the House approaches.

Mr. SKINNER. Thank you.

Mr. STENHOLM. Thank you.

Next we will hear from Mr. Joel S. Hirschhorn, Associate, Office of Technology Assessment, Washington, DC.

TESTIMONY OF JOEL S. HIRSCHHORN, PH.D., SENIOR ASSOCIATE, OFFICE OF TECHNOLOGY ASSESSMENT, WASHINGTON, DC

Mr. HIRSCHHORN. Thank you, Mr. Chairman. If my formal statement will be introduced into the record, I will not read it. I will try to answer some of the interesting and perplexing questions that have already come up during this hearing, and give you a somewhat different perspective on some of these issues.

OTA is an analytical support branch of the Congress that has been looking at toxic waste problems for over 5 years, so we think we have some close knowledge of these issues. Recently we released our report, "Superfund Strategy," and in fact, H.R. 3211 is entirely consistent with the findings of our studies regarding Superfund and toxic waste issues.

Your interest in innovative cleanup technology is extremely well-founded. First, let me say that we have heard from EPA today, as we have in the past at congressional hearings, that they say some of the most correct things. On the other hand, they tend to do something else entirely when it comes to what is going on in the field, so to speak, and how these programs are implemented.

You have heard quite a bit of talk, for example, on RCRA, Resource Conservation and Recovery Act. I think it is important to note that that program started in 1976. We are getting close to 10 years of the RCRA Program, and I want to emphasize that EPA during that period showed absolutely no initiative in moving away from land disposal.

It was only through acts of the U.S. Congress that we have seen this movement, some movement away from the use of land disposal. Left to its own, EPA in fact has supported the use of land disposal under RCRA for newly generated wastes, and left to its own it has supported the use of landfills for cleanup of Superfund sites.

Let me correct a few things that have been said, for example, by EPA. They like to talk about their own efforts in new technology such as their mobile incinerator. They fail to tell you that two private companies, one of which was Huber in Texas, had already demonstrated their technology before EPA's mobile incinerator.

In fact, EPA has not at all moved at the pace that the private sector has. A private company has a mobile incinerator in use and has had it in use for some time in the field cleaning up sites. In fact, the private sector, in cleaning up their own sites outside of

the Superfund Program, has shown a lot more interest in use of new technology than the Federal program.

I think that is very important. Technology in some cases is being used, new technology, at cleanups, but those are not within the Federal program. Let me also say that it is very important to put this in the proper context. One of our most important findings is that the scope of the Superfund problem is far greater than anything you have heard from EPA.

I think when you are looking at new technologies, you have to have a sense that the only way new technologies are going to make sense and pay off is if you have a need for them. The need is far greater than what EPA says. They are talking about cleaning up 1,000, 2,000 sites. Our analysis shows a 10,000-site possibility. EPA, including EPA's Administrator says publically not to worry. In 5 years, 10 years, we will clean up all the sites in the country.

It is impossible. It will take decades, 30, 40, 50 years easily, perhaps $100 billion just for Superfund and another $200 billion by the private sector and the States to deal with cleaning up toxic waste sites. So we are talking about a very large problem, and when you have a multidecade, multibillion dollar program sensible people think about developing technology to deal with those problems.

We have done it in the space program. We do it in the military area all the time. We think about technology as a problem-solving tool. We don't see that at EPA. People ask, why is this so? I would hasten to point out that EPA is essentially run by lawyers, not engineers. We have an emphasis on litigation and very little emphasis on technology at EPA.

We have heard a lot about a change in policy at EPA concerning the use of landfills. There is a very famous May 6 memo that was put out of EPA. Newspapers have dubbed this use of landfills as the toxic waste merry-go-round. We move cleanup waste from one site and put it into another, and then we are going to create more Superfund sites.

Well, there is an impression that this policy has stopped through the May 6 memo. I just want to absolutely make it clear to you, because we have been looking at EPA's recent decision since May, and we have examined many of these decisions on specific Superfund sites, there is no change in reality regardless of what policy statements they have put out. That is, the toxic waste merry-go-round continues to turn quite nicely.

Superfund wastes are continually taken from Superfund sites, and sent to RCRA facilities, most of which are not in compliance with the regulations. EPA's own data shows that facilities to which these Superfund wastes are being taken are already leaking, or are likely to leak. They are not part of the solution. They are part of the problem.

This practice is not changing, and nobody should think otherwise. Superfund wastes are slated to be taken to RCRA facilities throughout the country. What is this EPA strategy? People ask me all the time how do you explain what is going on. And I would say this in very simple terms: EPA strategy is to tackle as many sites as they can and to spread the money out rather thinly at a great

number of sites, and there are obvious reasons, saying we have taken action at so many sites, maybe hundreds of sites.

But in fact that doesn't mean that you are maximizing protection of the environment or the public. They have an interest in keeping costs low. You want the explanation to most obvious questions, the explanation has to do with dollars. Another factor is that EPA is heavily involved, as I say, using their lawyers to enter into agreements with private responsible parties to clean up sites.

The goal of those settlements and those agreements is to keep costs low. If you want to keep costs low, either by spreading the Superfund moneys out or if you are a responsible party, the way to do that is in fact to use land disposal. That is why it is not changing. The use of most of these new technologies means that the immediate costs would go up.

Now, if we look at the long-term perspective that doesn't mean we are paying too much. In fact we are probably paying—we are getting a good bargain if we use permanent solutions. EPA, in picking landfills, is only looking at the near term costs, and I disagree with other witnesses. They are putting a lot of blame on the statute. Well, no statute is perfect. We all know that here, but I would say to you in fact CERCLA gave what you just heard the people want. Flexibility.

It is interesting to me. In fact, the statute gave considerable flexibility to the EPA. How did they use it? Cost effectiveness doesn't mean you pick the cheapest technology. The statute says clearly protect human life and the environment. Cost effectiveness is choosing the lowest cost option to protect the environment, not the lowest cost period.

It is the interpretation of the statute that is the problem. Likewise, the statute has no prohibition about spending money for demonstration. It does deal with research and development perhaps. Research and development is quite different than demonstration. EPA could, and in fact has in a few cases, spent Superfund money on demonstrations, so they are not consistent in their own interpretation of the statute.

But I think another point here I want to emphasize that has not come up too strongly is almost all of the work and all of the decisions in the Superfund project are not made by EPA personnel; they are made by contractors working for EPA. This is a program that is totally dependent on contractors and very little effort has gone into scrutinizing the quality of work of these contractors.

We have in the past few months been looking very closely at the quality of these reports, for example, that are being done by contractors. There is a thing called a feasibility study. There is a very critical document. It was done by the EPA Superfund contractor to evaluate cleanup options and to make recommendations as to what EPA will use.

I can say flatly that these feasibility studies are lacking in quality. You mentioned the Love Canal situation. Well, we were the ones who did the study for a Member of Congress on that Love Canal situation, and what it reveals goes beyond the Love Canal situation.

What it reveals is that the contractors working for EPA are not aware of the technologies, are not making correct statements about

technologies, do not appear to be very interested in new technologies. And I do find it remarkable that people can sit here and express all these reservations about using new technology, and at the same time report after report and decision after decision that is signed by the Administrator of EPA make use of landfills which are known to be leaking to accept Superfund waste.

This is a remarkable contradiction. Why would you be so worried about new technology and at the same time have such an easy conscience in sending Superfund wastes to leaking landfills? It just doesn't make sense unless one is trying to minimize the cost, the near-term costs, and that is what is going on.

I again want to emphasize that what your bill is all about is demonstration, and sometimes this whole discussion gets muddied up by people talking about research and people talking about R&D. Well, I think of a spectrum. At one end of this table we can talk about basic research that people at universities do; and then we can talk about applied research: and then we can talk about development. And somewhere down at that other end of the table we are going to be talking about demonstration, working in the field under practical conditions dealing with real engineering situations.

The problem is that we have a pipeline that is clogged up; that is, we have already had a lot of R&D done. We have had a lot of private companies invest their own money in R&D, and nothing is getting out of this pipeline because demonstration cannot be done by private parties unilaterally.

To do demonstration for cleanup means you have to get into the Superfund system, and the Superfund system has not been opened to companies with new technologies. I see no sense in pouring more money into R&D until we demonstrate to the country and to the business community that, in fact, we unclog the pipeline; that we give an opportunity, just an opportunity, to test new technology. No guarantees, no assurances, no closing or limiting of the marketplace.

The marketplace right now is not an open marketplace. People cannot get their technology tested under real world conditions. Until this pipeline is unclogged, the situation will simply deteriorate, and as you heard the story today about the Huber Co. in Texas, illustrates this.

I hear this all the time. We get calls every week from companies with technologies, companies that tell us they don't know who to talk to at EPA, or they have already tried EPA and they are not getting anywhere. It is just one horror story after another.

It makes sense to spend some money on new technology, and H.R. 3211, I think, offers a very practical approach to unclogging the pipeline, if you will. I think the schedule approach is absolutely necessary. We all know, of course, that EPA has, I don't think ever met a schedule mandated by Congress. That doesn't mean schedules are not useful, however. It does give some structure to the process, and I think some schedule is necessary.

People may quibble about whether it should be 60 days or 75 or 90, and I think it really doesn't matter too much. And no, you will never get total agreement.

You have heard statements about analytical tests. I talk to people in the industry all the time. You can get analytical tests done in a week, if you want to.

The Government doesn't operate too efficiently, as we all know, and the private sector seems to be able to speed things along quite well when it wants to.

I think the schedule makes sense. And I think putting the Office of Demonstration in the Superfund Program is an absolute necessity. This is where the bottleneck is. This is where the pipeline is clogged. One has to deal with the real sites, and it is imperative that it be put in the Superfund office.

The Office of Research and Development has shown no great initiative in dealing with new technologies. As I say, the RCRA Program has been going on nearly 10 years; Superfund, 5 years. We have not seen initiatives in the Office of Research and Development.

I think an interesting question for you to ask EPA perhaps is, how much money do they actually spend on all these projects they like to talk about? In fact, you will find out their money is spread so thinly among so many projects that nothing much gets done.

So, I think your bill offers a very practical approach, and I think that some sort of demonstration program would really make tremendous economic sense as well as environmental sense.

We have spent the first 5-year appropriation for Superfund, as you know—about $1.5 billion. What have we gotten for that money, and what will we get in the second 5-year program if we spend $5 billion to $7 billion?

I suggest to you the biggest beneficiaries of Superfund are lawyers and contractors producing paper studies, and not the public getting environmental protection. In fact, there has been hardly any effective cleanup at any Superfund site.

I would hasten to point out to you, at Love Canal, which started the whole Superfund Program, in a sense, it is still not cleaned up after tens of millions of dollars have been spent. Same with the Stringfellow acid pits in California; tens of millions of dollars spent, and the site gets worse. There is precious little progress, real progress, being made even though billions of dollars are being spent.

People like to count numbers. They will tell you how many reports are done or how many sites are in progress, how many of this, how many of that, lots of numbers. In fact, if you go in and look at the sites and study what is being done, technically being done, and ask the question, "Are the sites getting worse or are they getting better; have they been permanently cleaned up or not?" you won't get too many positive responses even though the money is being spent and the reports are being written.

I also emphasize about these reports that we know of no mechanism within EPA where there is any technical oversight, any staff or any effort being spent to review these documents which form the basis of decisions on Superfund sites.

I keep asking the question for the last several months—people in industry, Government, everywhere—would any of these contractor reports pass any peer review process? And the answer is universally no. And we have done many studies, and there are more studies

about to come out from other groups that reveal a lack of quality control and poor procedures, as you have mentioned for Love Canal, poor analytical work in terms of analyzing the technological operations.

Thank you.

[Mr. Hirschhorn's prepared statement follows:]

Prepared Statement of Joel S. Hirshhorn, Senior Associate, Office of Technology Assessment, Washington, DC

Mr. Chairman and members, thank you for the opportunity to provide this committee with the results of our recent assessment SUPERFUND STRATEGY, that are pertinent to H.R. 3211. We feel your interest in innovative cleanup technologies for the Superfund program is well founded.

It is important to put the subject of innovative cleanup technology in the proper context. Our analysis finds it likely that the National Priorities List could climb to some 10,000 sites with improved identification and discovery efforts, and with improved methods of evaluating and ranking sites. Costs to the Superfund program could reach $100 billion over perhaps 30 years, with possibly twice that amount in cleanup costs paid by the states and industry. The nation, therefore, has only begun to clean up toxic waste sites. OTA believes that the least expensive way to do this job will be to develop and use innovative cleanup technologies that will yield permanent results.

It is now widely recognized that, during the initial cleanup program, substantial amounts of cleanup wastes were shipped to landfills regulated under the Resource Conservation and Recovery Act. OTA has found that operating landfills are bound, sooner or later, to fail in some way, with the most important threat being contamination of groundwater used for drinking water. RCRA regulations, we have found, suffer from many technical inadequacies and are poorly enforced. The result is that operating hazardous waste landfills are already leaking, are likely to leak, and cannot solve the Superfund problem. Indeed, many of them are likely to become part of the problem themselves. Thus, risk is being transferred from one community to another. An environmental deficit is being created for future generations. Has this practice - sometimes called the toxic waste merry-go-round - stopped? Unfortunately the answer is no. We have recently examined decisions for remedial cleanup at Superfund sites and found that it remains common practice to remove cleanup wastes for burial at RCRA landfills.

Although there are some available, proven waste treatment technologies that could be used for some Superfund cleanups, they are not widely used. Cleanup wastes could be shipped to commercial incinerators, mobile incinerators could be used on-site, or for some especially large sites, incinerators might be constructed on-site. There are also chemical and physical treatments that are available offsite or that could be used for on-site treatment. Evidence is accumulating that innovative cleanup technologies that have gone through the demonstration stage successfully are not being seriously considered for Superfund cleanups. EPA strategy seems to be to tackle as many sites as much as possible; this leads to attempts by EPA to keep immediate cleanup costs for a

site as low as possible. Another explanation is that agreements between EPA and responsible parties aim to keep initial costs within certain relatively low limits. Two other factors relate to contractors working for EPA: poor information and analyses; and an apparent reluctance to specify the use of patented or proprietary technologies even though they may be the most cost-effective. Moreover, even the initial cost for using land disposal is climbing rapidly with the advent of more stringent regulations required by Congress and increasing demand for existing capacity. But even though the added initial cost of permanently effective remedies is decreasing, most EPA officials and Superfund contractors continue in our view to be overly pessimistic about waste treatment technologies, both old and new ones.

Our report SUPERFUND STRATEGY describes 26 innovative cleanup technologies and presents the results of a workshop we conducted that examined why firms were having problems getting their technologies considered and used. Today, there may be as many as 50 innovative cleanup technologies that have not been able to reach the demonstration stage. The Superfund program has not established a standard, nationwide procedure so that companies, many of them small businesses, can demonstrate their technologies at actual sites under conditions which EPA can certify as proper.

OTA agrees that more R&D could be supported to develop new cleanup technologies. However, OTA has found that the most critical need now is for a formal program within EPA's Superfund effort to demonstrate under field conditions those many technologies that have gone through the R&D process (many of them without any Federal assistance). In other words, the pipeline is clogged because the results of R&D are not being used. The very large scope of

the national cleanup problem makes the demonstration of newer, more effective cleanup technologies necessary. The costs of present cleanup methods may ultimately become too great to afford. The spending of tens of millions of dollars now on demonstration tests could save billions of dollars in the long run. It is discouraging for companies to invest so many of their own resources in developing technologies and then not be able to get support, encouragement, or assistance from the government for the demonstration that will "prove" their technology to the level government requires before it will seriously consider it for cleanups.

To sum up, H.R. 3211, which would establish a demonstration program under Superfund, addresses in a practical way a critical national need, and is consistent with the findings of OTA's studies. Our analysis indicates that it is in the national interest to facilitate and expedite the demonstration and use of new cleanup technologies; technologies that might deal with the enormous amounts of contaminated soil and underground water found at thousands of uncontrolled toxic waste sites are particularly important. Many cleanups might be done on-site so that little cleanup waste has to be removed and transported. Consequently, it makes both environmental and economic sense to focus on new cleanup technology. The spending of a relatively small amount of Superfund's resources on this effort need not hurt or delay cleanup. There is much that can be done now to safeguard the public's health; for example, much more effort could be made to discover, identify, and evaluate sites. And there are a host of common sense and relatively simple things -- such as covering sites to prevent water intrusion - that can be done to put all NPL sites into a condition that reduces immediate threats to health and environment and prevents the sites

from deteriorating. The trade-off between taking effective - but limited - action at all sites versus taking expensive but marginal or ineffective cleanup actions at very few sites could be made more attractive by a commitment to unclog the pipeline by expeditious demonstration of innovative cleanup technologies.

Numbers are not necessarily a good measure of effectiveness. It is not enough to count the number of sites studied, or slated for cleanup, or cleaned up in some uncertain way; the quality and permanence of the cleanups needs to be factored into the performance of the program. The American public is clamoring for action at Superfund sites, which will be costly. Technology could be the key to spending the money wisely.

Mr. STENHOLM. Mr. Smith.

Mr. SMITH. I find your testimony extremely interesting and challenging, if you will, kind of overwhelming. As one new Member of Congress sitting here—you think back over the history of the Superfund and the intent of the legislation obviously was very admirable.

Are we in a position here where it is one of those situations, Superfund, a good sounding name—if you speak against it—you say we don't need $7.5 billion, then you are on the hotseat.

On the other hand, what you are telling us here today is that the EPA ought to be the focal point or the catalyst in this whole process so you gentlemen can get on with the job of cleaning it up. That is what you want. But what you are really telling us is we have got a roadblock here with EPA. That is pretty harsh criticism, and I wondered if you could just—with time constraints here, I realize, Mr. Chairman—if you could be a little more specific.

What can we do as a legislative body in this country—what can we do? You are saying this bill is a step in the right direction, but you heard from EPA. They said essentially they are afraid of these timeframes, or they are not in agreement with the timeframes that are in the bill that we are talking about here today.

What is your suggestion specifically? What can we do to get things off center? I find it very frustrating. We have got the technology as stated. It is here. It is with us. We can use it. We ought to use it to clean it up.

We are spending probably as much as $10 billion more in Superfund, and essentially you are telling us if we do we are probably going to waste it because we are going to have to have more site cleanup later, because we are simply moving it one place to the other.

How do we get off center?

Mr. HIRSCHHORN. I think your bill is a very important step. I see it as a critical turning point in the evolution of the Superfund Program that now we have this bill and a few others that deal with

technology and new cleanup technology. That was not an issue that got any attention at the beginning.

The first response was almost in a crisis atmosphere. That is, we had to do something about toxic waste sites. And the first response of Government is, well, we will throw some money at the problem. And I think now after 5 years of the Superfund Program, what we have said to Congress in our report, is that money alone is clearly not the solution. Throwing more money at it, without questioning how the money is spent, would be very unwise.

We have suggested ways to spend $5 billion or $7 billion or $10 billion. There is no problem in spending the money. But I think there are wiser ways to spend the money. For example, all these decisions now at sites and in your State and every State essentially to spend $5 million or $10 million or $20 million at a site simply to move the waste to another landfill is a silly kind of decision.

What we have said is stop spending the money that way; and if you don't have available permanent cleanup technology, don't spend the money on something you know won't work.

There are, in fact, temporary things that can be done. The General Accounting Office also has done work in this area that agrees with our analysis. Just a specific example, we have sites all over the country that are never physically covered up even with a sheet of plastic. These are lagoons, for example. The rain enters and overflows. The toxic soups that are sitting there and the toxic materials flow out from these sites onto the ground, into the river, into the ground water.

It doesn't take much common sense to realize maybe the smartest thing to do is put a sheet of plastic over these sites. They don't do things like that. Sites are sitting out there all over the country getting worse and the money is spread thinly at other sites moving the waste around, playing a game.

Mr. SMITH. You guys, the bottom line we are all in it together, the Congress, the American people, the businesses, the victims of these sites, we are getting together. We ought to be pulling in the same harness here or all pulling together in the same harness. We are not doing that obviously.

What—I am trying to follow through on your line, because you came on pretty harsh on EPA—what in the world would be the motive of any bureaucrat in EPA or any person in EPA—technocrat, lawyer, or whatever he happened to be, he or she—what would be the motive of not getting your technology into place so that we can begin to get the problem solved? Is it just the transition phase?

Mr. HIRSCHHORN. No; I think this is a motive, in fact, in turning sites around quickly, taking action quickly, we can dig it up and take it to a landfill, we can do that quickly, keep the immediate costs low. I think trying to gin up numbers to show that you are taking a lot of action and at a lot of sites is one reason to keep costs, immediate costs low. Another reason is that those bureaucrats are going to be out there job working for a contractor, making a lot more money, before these things are revealed to have failed. These people are moving through the system.

I have pointed out in some of our reports—you take an EPA staff person who is in charge of sites, what incentive does that staff

person have to say wait a minute, things aren't going right at a site? Often the EPA person will pass that site through the system as quickly as possible, not to slow the process down and say to the contractor you are wrong, it is not good quality, we are going to have to top this process for that site. All the pressures are on the EPA staff person to not rock the boat and to let things go along and to let those actions proceed even though the actions are ineffective.

We have been told privately for years when we talk to people, that they know these things are not going to work. You have heard some things today about land disposal from EPA, senior EPA people. I hasten to add for 10 years they have been promoting the use of land disposal. They never tried to halt use of land disposal. It won't work, yet they continue to use it.

I think we all do have to get together on this. I think what is important is to raise the issue of performance effectiveness; are we getting something for the money that we spend on cleanups or are we just getting some action to please people for the near term? That is really the problem. It is really not that complex a situation.

By the way, the National Academy of Sciences said the same thing as we have said and what you heard today, for every toxic waste without exception, there is a technological means to render that waste harmless. That is very interesting that we don't use technology in this area to solve a major national problem. There is a complete underutilization of advanced technology in the area.

Mr. SMITH. As it stands right now, there is no existing law which would capitalize?

Mr. HIRSCHHORN. You may have heard the phrase, "technology is forcing the statute," and the way EPA has interpreted and implemented the statute, has not been technology forcing essentially. They have been really more in the line of cost minimization.

Mr. SMITH. Thank you.

Mr. STENHOLM. I remind everyone again that the purpose of H.R. 3211 in this discussion is to encourage the use of innovative technologies, including technologies used by small business for cleanup of hazardous wastes. You focused very specifically on that, and it is tempting to get into some of the specifics of what is working and what is not. That is not the purpose of this hearing, and that is not the purpose of H.R. 3211. The purpose of H.R. 3211 is to provide a more level playing field for all business innovators to solve the problem, and that is the specific goal.

The one question that I want to ask you is in the area of public participation and community response and any observations you may have to assist us with dealing with that problem. When you have got a hazardous waste problem in the community, you have got real trouble doing anything that is technologically feasible. If you are going to be talking about demonstration, I think we need to recognize that problem if you are going to comment.

Mr. HIRSCHHORN. I agree, and I have traveled around the country. I go to communities with Superfund sites. I have spoken to the public out there. They certainly are concerned and they certainly want action. One of the points is the fact that doing some form of demonstration at a site is no substitute for taking other actions at the same site to recontrol and stabilize that site, to deal with those

immediate threats to public health and environment, and to prevent the site from getting worse.

There are immediate kinds of actions that should be taken at all of these sites and I don't think any kind of demonstration program has to be viewed, nor do I think it will be viewed generally by the public as somehow preventing cleanup or standing in the way of cleaning up.

Our discussions with the public and various groups out there indicate, by the way, that over the last year or so I think this is going to get stronger, that they are becoming increasingly aware of the ineffectiveness of the actions already taken at their sites. I give the public some credit. They are not stupid people out there. They understand, as Stringfellow and Love Canal and numerous other sites around the country—Missouri is still going on for years—that they see the money being spent and they see that it is not being spent effectively, and I think the time is really right now for this kind of measure.

I think the public wants to see some efforts put on developing new technology. Quite frankly, if you speak to the public they are amazed to find out that the Government is not putting much money, has not put much money into new technology. I think there is just a misreading out there. They think the technology is a higher priority when in fact it has not been a high priority in the Superfund Program.

Mr. STENHOLM. Dr. Hirschhorn, I thank you for your testimony today. Certainly you are someone who has dealt with the situation we are trying to address. We appreciate your input to this subcommittee and will extend the same invitation to you to continue to work with the staff and to help us dot the "i's" and cross the "t's" when we get through passing H.R. 2817, of which H.R. 3211 I hope will be one small but significant part, to help us move in the direction we need to move.

Mr. HIRSCHHORN. Thank you.

Mr. STENHOLM. We appreciate it.

Next we will hear from Mr. Robert Schreiber, the director, division of environmental quality, State of Missouri, Jefferson City, MO, and Mr. James Neal Welsh, president, Shirco Infrared Systems, Inc., Dallas, TX.

TESTIMONY OF ROBERT SCHREIBER, DIRECTOR, DIVISION OF ENVIRONMENTAL QUALITY, STATE OF MISSOURI, JEFFERSON CITY, MO,

Mr. SCHREIBER. Thank you, Mr. Chairman.

Mr. Chairman, members of the committee, my name is Robert J. Schreiber. I am director of the division of environmental quality for the Missouri Department of Natural Resources, and I reside in Ashland, MO.

Mr. STENHOLM. I would say to you also that your entire statement will be made part of the record. Are there any summarizations or extra observations that you might like to make?

Mr. SCHREIBER. Oh, well, I have a slide presentation I would like to present to you today. I think that may be able to answer a lot of questions that you have on how Missouri went about demonstrat-

ing the research facility at Times Beach, which was going to be the topic of my discussion.

Basically, we outlined the problem. It became quite apparent that in November 1982 that Missouri had a significant problem of dioxin. Governor Bond put forth a task force to identify technologies that were available in 1983 and came up with that no technologies have been demonstrated to have effectively destroyed dioxin at this particular time. That report came out in November 1984—excuse me, November 1983. We then went forward with the interim storage facility at Times Beach and tried to promote that type of facility for a number of sites that needed to be cleaned up.

During the course of the public hearings process on the permit for the interim storage facility, alternative technologies were being presented, such as inplace treatment with various chemicals, in-place treatment with various enzymes, as technologies that were purported to have be proven in the field.

In studying the test results that the people put forth for the demonstration of their technologies and evaluating field data we knew to exist at a variety of Missouri sites, it became quite apparent that one of the problems with looking at the new technologies was sample variations that existed with the data in the field. The problem in Missouri we may have a sample point that would exhibit a concentration of 1,100 parts per billion, whereas 5 inches away from the same sample, point sample variation could have indicated a 50 parts per billion.

That type of variation in the sampling data for the field demonstration projects yielded technical data that was useless to us as regulators and people trying to identify solutions as far as being able to define what is an effective technology to possibly get dioxin-contaminated soil below one part per billion.

So in February 1984, the Department of Natural Resources, working with a research committee with the University of Missouri and also the U.S. EPA, identified a committee to design a field test research facility where we, coming forward, allow some of these people who have supposedly demonstrated in-place treatment capabilities to define whether or not those technologies would work, and we picked the city of Times Beach, MO, as the proper location because the State of Missouri was going to be the proud owner of that facility in a short period of time.

So we designed a research facility between February and May 1984, and then we had our hazardous waste contractor to contract and build it. It cost us about $300,000 to build the facility. We started about June 1 in the construction mode and we completed construction of the research facility by the end of July. This allowed for some in-place research activities to occur. The first growing season between July 30 and November 1984.

We had a number of people interested in the research facility at that particular time. Monsanto Chemical Co. had a theory that they were pursuing to where the appropriate mode of transport of dioxin and contaminated soil was vaporization. Their feelings by laboratory tests and tests in Times Beach, MO, indicated that material came off the soil as a vapor and went into the atmosphere where the UV light then would kill it.

36-165 O—86——3

Their research activities to date indicate—specifically the test that was taken back in November of last year—did not indicate any significant difference between July 30 and November 1, 1984. However, we were not really expecting that difference to occur because of the short time period where the material would be made available to temperatures during the summertime where most of the evaporation would happen.

Other companies, Agro-K out of Minneapolis, MN, Parts Per Million out of Atlanta, GA, have been working on a similar enhancement program where their philosophy that the natural bugs that exist in the soil, if enhanced by some biological media, they have developed the opportunities or they have formed into bugs that have an appetite for dioxin, therefore, if you caught them to grow, they would naturally eat more dioxin in the process of performing their biological actions. That study—again that was taken between July 1984 and the first round of tests that were done in November 1984—did not really indicate any significant difference between the pretests and the posttests.

One success that we had was the J.M. Huber Corp. that did come to Times Beach, November 1984. Their technology was recommended by research evaluation that Dr. Hirschhorn did in the review of our documents for the Times Beach storage facility. We approached Huber. They were interested in bringing their operations to our research facility, and within 3 months we were able to bring them on board and have them set up to where we would have support systems in place to provide them with the necessary electrical and water supply and security to where they could perform a dioxin decontamination test.

That was completed within a 1-day time period and the results from their tests came in early December, and they indicated that they were able to take dioxin contaminated dirt that had a level of contamination of about 100 parts per billion and bring it down to no detectable limit by use of an advanced electrical reactor. That is a new technology that basically drops fine-ground contaminated dirt the consistency of face powder through an orifice that goes past a 3-inch diameter graphite tube.

By electrical heating of that tube by induction, the contaminated soil approaches 1,500 degrees Fahrenheit. Organic material as we know it, really doesn't exist in those temperatures, so it decays down to its own compound and you come out with basically reformed silica, which drops out as a sandlike material and carbon dioxide or carbon monoxide and water hydrochloric gas elements break down to its molecular state and reforms into a very simple compound.

Also, Shirco, Inc., decided to come to our research facility around July 10 of this year. They have a technology that is an infrared heating device where the material basically passes along a moving grate about 3 foot wide, approximately 1 inch deep of soil placed upon the grate, infrared heating element raises the temperature of the soil up to about 1,600 degrees Fahrenheit, the dioxin molecule comes off as vapors, vapors are then collected and they go to afterburner, which reached temperatures in excess of 2,200 Fahrenheit, similar to what the EPA mobile incinerator achieves, and we just got the results back on the Shirco test and they indicate they were

capable of destroying dioxin-contaminated soil—not destroying the soil but destroying the contaminant from the soil. There were no detectable levels of dioxin in either the exhaust gases or the water.

So as a result, by us going forward and building our research facility, we have had companies come forth and try and demonstrate new technologies. We have had success in the thermal treatment processes and I think from what we have seen with our research, that the thermal treatment is an effective way for destroying dioxin contamination as long as you reach basic parameters which have been demonstrated by the Shirco process, the Huber process, and EPA mobile incinerator.

We are still looking forward to in-place treatment technologies as also being a cost-effective solution, if they can be proven, to be effective for working on a very low level of contamination.

It is our feeling if you can save the cost of excavation and transport, which is a significant cost of cleaning up, and something can effectively treat the soil in place, that would be the most optimum solution. That may not be the effective solution for all of Missouri dioxin-contaminated sites. Obviously we would be able to do in-place treatment at Times Beach, MO, because we are going to own Times Beach. There is not going to be anybody living there to decide to dig the streets up and over 2 years you are not really bothering anybody doing that.

However, at some of the other facilities, some of the other sites like Castlewood site where you currently have people still living in the area, the option of digging up the streets and trying the 2-year treatment process in an area that is still inhabited is not acceptable. We would be looking for a more timely solution to the problem, which would be excavation and storage, until a more permanent treatment process comes along, such as the Huber process or the Shirco process, or the rotary kiln incineration process.

We are generally in support of the bill. We think it is a good concept. It is something that we feel is needed. We don't think that it is appropriate to spend Government money to help finance private industry, especially if there is going to be a market down the road, if there are new technologies proven successful, we feel they can find that financing through the normal marketplace, but in general we are totally supportive of the bill and we would be happy to offer any further comments that you would want, or answer any of your questions.

With that, I would like to give a short slide presentation of what we have done at Times Beach. The philosophy we went with in Times Beach is trying to identify an area to where a private researcher could access the points, drive in in his car, do his research and leave without having to go through a lot of rigamorole with contamination and decontaminated vehicles.

This is a map of the contamination of Times Beach. The red is the 100–300 parts per billion. The blue is a 5 to 20 degrees, 1 to 5.

We were able to find an access road coming in—I–44—where you can come across Lewis Road, come down this route access and then come on down at the head point. One of the most contaminated roads—which was Laurel Road—we decided to build the research facility there, allowing the primary access to be along a clean

route. This has proven to be quite effective for getting people to use the facility.

What we decided to do was scaft the asphalt off the road, make available the highest contamination soil, and then scafted the 6 to 9 inches of soil and place it in an area for treatment. That is the asphalt material that was taken off the road and placed at one end of Laurel Drive.

We then went in and scafted 61 research bins that were put into place so that we could replace the contaminated soil after it has been screened and mixed so that we would get around that problem that we had at some of the other sites where you have sample variability of 1,100 parts per billion in 5 inches and have the sample program——

Mr. STENHOLM. Whose technology was this?

Mr. SCHREIBER. This is no specific technology. That was our design that we came to.

Mr. STENHOLM. It was your technology, your attempt to clean up the problem that you had?

Mr. SCHREIBER. This was our attempt to offer to private researchers the opportunity to demonstrate their technology, and we came up with the idea. We funded the project, and we are making it available to people like Shirco and Huber and Agro-K and Parts Per Million at our cost for them to use our facility with our oversight.

This is one part of the process that the research group that included representatives of PTM and Agro-K came up with and Monsanto, in the design of what they needed for the research facility. This is not something that we as DNR decided, this is what you need for your solutions. We said, OK, what do you need to help demonstrate your technology. What are some of the pitfalls you see in trying to do it out in the field without support systems around it?

It took us about 4 months, working with the group of about 20-25 people to come up with the design and the problems that were encountered in the construction phase had to be overcome in the process of construction.

One example, as you will see, is trees on both sides of the road. About the middle of June the research group went out there and all of a sudden Monsanto came up with the idea that part of the problem that we foresee is the solar variation in solar radiation that is going to get to the site, therefore, you need to remove the trees from both sides of the road. That was not in the original design so we had a heck of a time getting people knowledgeable in cutting down trees in contaminated areas, and not fell them on the fence already built out there, to take down the trees to make sure of consistent solar radiation on the site. Those kinds of adjustments had to be made as we went along.

Right now, what they are doing is digging the pits for the stainless steel bins that are going to be put back in place to simulate normal contaminated soil, enter the soil conditions and temperatures that exist in Times Beach, MO. What we are shooting for is a consistent 2-foot depth and we also provide water supply and electricity to each set of—that is the area that you see down at the

end—that is the dirt that will be put back into place on the right into the research facility after it has been screened and mixed.

Those are the stainless steel bins that were then placed in the holes that you saw on the streets. They are 6-foot wide by 8-foot long. They have a geotextile material underneath them to allow for free drainage as they would simulate a contaminated site in Times Beach, MO.

That is the actual screening process occurring because of the sample variation being associated with pulling the sample and analyzing it. Experience indicated that rocks tend to cause variability in sampling, if you have got a two inch size particle and you crunch it with a dirt rock not contaminated, that would cause you to have a variability of the sample that may show up as a decreased contamination, depending on how you take the sample.

So we decided to screen to a half inch, then we transferred it to a 10 cubic yard cement mixer where the mixer continuously running to 6 to 8 hours, so at the end, when we were able to achieve 10 cubic yards we had homogenous material we could recompact into the research. That is the replacement of the mixed soil—homogenous mixed soil into the research bins.

What we do is, each one of those stainless bins was 3 cubic yards; one batch of concrete or a concrete mixer would hold 10 cubic yards. Therefore, we could come up with 3 identical units from the same batch of 10 cubic yard mix, so that we would have three separate sets, or three identical units, to go into one research plot. This was allowed for rechecking the various processes.

That is the material being replaced into the stainless steel bin and then it was compacted to 80 percent of the normal density to simulate soil conditions in that area.

An important part of the program that we decided was necessary was to have DNR oversight of the research activity and so we, as part of the protocol that we set up with the researchers, we take a first round sample to verify the original degree of contamination in the research bin.

We are also responsible for a sample in November to verify what the levels are at the collection of a growing season or test season, and then we take the samples to our laboratory, we have them analyzed, and the samples are reported to us. That is our person actually doing sampling of that product at that point in time.

That is the sampling protocol that was agreed to between the researchers and the department, five separate sets of 2-inch-diameter, 2-foot-long core taken, split in half and top 0 to 1, and 5 to 6-inch samples, then deposited to form the background concentration for that research.

That is the array of original sampling. After the material is originally sampled we cover it with insulation, to reflect the heat, not allow for influx of solar radiation because of decreased dioxin concentration until it is decided to be researched. That is our person pulling the sample.

Also at the facility, which became useful during the course of the research activities, we have an off-road vehicle and trailer, we have a decontamination area, we have a soil laboratory and observation area. J.M. Huber came forward—they were not included in the original design. We were able to adjust the design of the research

facility to meet their needs. That is their people taking 100 pounds of soil to the advanced electric reactor for testing and that is then going to the other end of the research facility with our off-load vehicle. That was necessary because of the temperature you reach in the protected sites. It is not easy to do a lot of heavy work over an extended period of time without becoming exhausted so that kind of equipment was very successful.

That is the top of the Huber reactor where the soil is dropped down into the 3-inch graphite tube, and that is the bottom of where the soil is then dropped into after it melts, then reforms from a liquid to a solid phase. That is where the sample was collected. That is the Huber trailer with the 3-inch reactor on site, actually doing the test to demonstrate dioxin in destruction.

At the top, you see the container that contained the 100 pounds of soil the technicians were feeding by conveyor into the 3-inch reactor. Right at the bottom of that area is where you saw the base container that collected the soil. Off to the left you see a lot of air pollution control equipment that was in place and the sampling equipment that was being done to verify that it met all the environment.

That is the sampling test going on for the air emissions. They also had on sight a gascromatograph, mass spectrometer—mass spectrometer to give a quick turnaround on samples. They could actually get 24-to-48-hour turnaround on dioxin analysis on sight to see how the particular testing was going on and whether or not it was being effective for doing the destruction process. This is a Shirco infrared system. This was the facility that was brought up to Times Beach July 10 of this year and it is the infrared treatment system that works in the process that I have described earlier.

The stack you see toward the middle of the picture comes from the Venturi scrubber that is the air pollution control device for bringing out the dust that may be generated by the thermal destruction process or by the dust carryover from the thermal destruction process. Very simply, contaminated soil was provided to them in 55-gallon drums that was collected from the Times Beach research facility, was put into buckets. The buckets were transported to the feed hopper for going to the thermal incinerator. It was treated with infrared heat and then the off-gases from that went to a gas afterburner where the high temperatures were achieved for total dioxin destruction.

Another aspect of the research facility—I mentioned earlier, the trailer you see down at the end is the Deiner observation area. All tests that occur, all access to the research facility is controled by the department. Whenever anybody goes there to do any work, one of our personnel oversees the activities so that we are knowledgeable of what functions are going on.

If they are proprietary in nature, we don't necessarily have to know what the chemical is, but at least we know so and so sprayed some X chemical in plot B and then when we took the sample later on, we would be able to tell or should be able to tell what happened to that particular sample.

To the left of that, behind the concrete truck is a dirty lab, a lab inside the contaminated area where samples can be prepared. They

can, when you take the samples from the site, you can take them in there and get them ready for packaging. It's very useful for being able to monitor moisture content and other research plots and other types of equipment can be brought in by researchers and stored there that they can use which may be functional to their particular activities and off to the far left there is a decontamination area where researchers can come in, in their street clothes, put on their protective equipment, go and do their research activities, go through the area and take showers, leave their dirty clothes on the dirty side of the research side and then get in their car and drive off.

This whole process was identified to give as much assistance to researchers as possible. The State is not doing the research. We don't foresee ours being in the mode of developing new technologies, but the interesting thing about it is if anybody in the industry was to come in and try and do this particular function, to demonstrate new technologies, you would have a startup cost of anywhere between $150,000 to $200,000 to provide for the decontamination area, the dirty soil lab, third-party oversight.

That doesn't include any permit fees or permit cost. If you got through a normal permitting requirement now, it could easily cost from $100,000 to $200,000. So by putting these combined facilities together and then charging industry, our cost split up amongst 20 separate research sites, we were able to get an individual's cost down for performing research on the dioxin research site to about $15,500, including third-party oversight and pretesting and posttesting for 1 year.

For the Huber process and for the Shirco process because they didn't take up a research bin and use that in perpetuity and were only using 100 to 200 to 300 pounds of soil, their costs were significantly lower and we think that was an appropriate way to go so we decided to do it.

Thank you.

[Mr. Schreiber's prepared statement follows:]

PREPARED STATEMENT OF ROBERT J. SCHREIBER, JR., DIRECTOR OF ENVIRONMENTAL QUALITY, STATE OF MISSOURI, JEFFERSON CITY, MO

Mr. Chairman and members of the Committee, my name is Robert J. Schreiber, Jr.. I am the Director of the Division of Environmental Quality in the Missouri Department of Natural Resources, and I reside in Ashland, Missouri.

The Department of Natural Resources has been aware of portions of the Missouri dioxin problem since dioxin was identified by the Centers for Disease Control in 1975. This problem originally manifested itself as an unknown contaminant that caused the deaths of a number of horses and caused sickness in some of the residents during the spraying of waste oil in 1971. Subsequent to those problems being identified, the Department, along with the United States Environmental Protection Agency, has been primarily interested in dealing with the larger magnitude of the problem, and worked in conjunction with Syntex Agribusiness to develop a technology that was implemented in 1980, for the destruction of 4,300 gallons of waste oil still in a tank in Verona, Missouri, by a process known as photolysis. In this process the waste oil is placed in a hexane solution and exposed to high-intensity, ultraviolet light which breaks apart the dioxin molecule. The clear hexane solution allows the light to make contact with the dioxin through the heavy, dark oil. That process seemed to be effective for decreasing dioxin concentrations from 343ppm to below 1ppm, but was not considered of at that time, nor is it now, as being effective on contaminated soil.

Between 1980 and 1982, many new sites in the state were identified. The discovery of these sites prompted Governor Bond, in February 1983, to form a Task Force to identify the known health effects and technologies that were associated with the dioxin contamination problem that existed at that time. In October of 1983, the Task Force indicated that no technologies were available at that time for the decontamination of dioxin-contaminated soil. Many technologies were looked at, but none were commercially available. It was the conclusion of the Task Force that technologies would not be developed to address the dioxin problem in Missouri on a commercial scale for two years.

Subsequent to that October report, the state of Missouri and US EPA went forward with a proposal to contain and secure dioxin-contaminated materials at Times Beach, Missouri. During the course of carrying that proposal through the public-hearing process, other technologies were purported to be available that would make that particular option moot.

Many of the comments that were raised during the public-hearing process suggested that alternative technologies be researched or demonstrated for dioxin decontamination. However, because of the variability of soil contamination that existed at locations where "new technologies were demonstrated," scientific data did not indicate the new technologies really worked.

The underlying problem in evaluating new technologies by the Department and the United States Environmental Protection Agency, was the sample variability that existed at many of the dioxin-contaminated sites. It was not uncommon, for example, to have contamination at Rosati exhibiting levels of 1,100ppb, and six inches away having a level of 50ppb. This variability did not lend itself to independent evaluation of technologies that different researchers at that time were trying to use in the field.

In reviewing technological approaches in February of 1984, the Department of Natural Resources decided to develop a research facility at Times Beach that would allow for the demonstration of new technologies, primarily for in-situ treatment of soil as an assistance to researchers who were trying to market a commodity that would be helpful in solving Missouri's problem.

We organized a committee formed of members from the faculties of major universities in Missouri, researchers at some of the leading chemical companies in Missouri, and state and federal officials to design and conceptualize the Times Beach Research Facility. This design process lasted from February to May of 1984, and in June of 1984, construction began on the facility, with the expected completion date of mid-July.

By the end of July 1984, the Research Facility was completed, with some design changes occurring during the construction process. The original conceptual plan was to take a stretch of Laurel Drive between Orchid and Beach that exhibited the highest level of contamination occurring in Times Beach, remove the asphalt cover, excavate the six to nine inches of contaminated soil, and store it at one end of the street for processing. The processing consisted of screening the material to one half inch, transferring it to a ten-cubic-yard cement truck, operating the cement mixer for six to eight hours, until it was full, recompacting the ten cubic yards into three identical stainless steel bins, six by eight by two feet deep, and then compacting to 80% of the nominal density.

The resulted construction project yielded sixty-one research units, which consisted of twenty sets of three identical units and one control unit. These research units were subsequently provided with water and electricity at each set of three units, and the support facilities for the researchers were placed at one end of the research facility. These support service systems consisted of an observation trailer; where DNR personell observe all research activities in progress by the different entities doing the research. There is also a decontamination trailer, where researchers can change from their street clothes into their protective equipment.

There is on-site storage and showers. A soils lab is located in the dirty side of the research facility, where basic soils parameters can be tested and samples can be prepared for analysis by outside laboratories. Also, in support of the research activities are an off-road vehicle with trailer for carrying equipment through the facility, a high-pressure steam cleaner for decontaminating any equipment that comes into place, and the appropriate decontamination areas for the equipment. Located at the other end of the research facility is a one-half acre fenced location where the soil was prepared for the research units. This has been converted into an area for larger treatment technologies such as J.M. Huber and Shirco thermal treatment devices.

The research facility was available July 30, 1984, and since then a number of researchers have tested different processes for dioxin destruction. Monsanto Chemical Company has been testing a vaporization process, which is a natural, ongoing vapor phase transfer of the dioxin molecule from the soil matrix. Monsanto has demonstrated by computer modeling and laboratory testing that dioxin demonstrates a low vapor pressure, which may be the primary mode for environmental transport.

The theory by which Monsanto is operating at the research facility is that the dioxin concentrations in the upper two-and-one-half inches of soil decreases over time through evaporation and transport into the atmosphere where the ultraviolet light will then destroy it.

Another test activity that is currently going on is an enzyme degradation process being tried by Agro-K of Minneapolis, Minnesota. This process operates by providing an enzyme media to the research plots so the natural bacteria can develop the capability to break down dioxin molecules. By enhancing this process with the growth media, the natural biological process will cause for degradation of the dioxin molecule over time. Another process using this same approach is being tried by Parts Per Million from Atlanta, Georgia. Monsanto and Agro-K were started in July of 1984, with DNR doing pretest sampling. Samples were subsequently collected in November of 1984, but no significant differences were found with the first round of sampling. We did not really expect to find a decrease in such a short period of time, but we were hopeful.

In November of 1984, J.M. Huber brought in the advanced electric reactor for testing, and on November 13, Huber demonstrated that its high-temperature thermal treatment device was capable of destroying dioxin in contaminated soil.

This process works on a theory of raising the temperature of the finely ground contaminated soil to approximately 4,500 degrees farenheit in a non-oxidizing environment. The advanced electric reactor consists of a three-inch graphite tube that was heated externally by electrodes radiating at temperatures of 5,000 degrees farenheit; the graphite tube subsequently reached temperatures of approximately 5,000 degrees farenheit. There was a nitrogen blanket that kept the falling soil from impacting the side of the graphite tube and the organic material in that soil would basically break down to its basic molecular constituents in the process of heating up. The soil formed into a liquid and reconverted to a solid as it went through a cooling chamber. That material was tested after it was thermally treated and there was no dioxin to be found at less than 1ppb. The exhaust gases from the reactor go in to a bag-type dust collector and also to a carbon absorption unit where any material that theoretically could escape would be finally collected before gases then went to the atmosphere. The unit that was tested at Times Beach treated approximately 100 pounds of soil in the one-day test.

On July 10 of this year, Shirco, Inc. from Dallas, Texas, brought in a portable infrared heating system that also demonstrated the capability to decontaminate a dioxin-contaminated soil below 1ppb. This particular system consists of a moving belt where the soil is placed in approximately 2-inch deep, by three-foot wide layers.

It passes underneath electric infrared heating electrodes that raise the temperature of the soil to approximately 1,600 degrees farenheit, the dioxin and organic molecules are driven off the soil in a vapor phase, and the exhaust gases are then collected and go to an afterburner where the temperature is raised to an excess of 2,200 degrees farenheit for greater than a two-second residence time. Those gases then go to a high-efficiency venturi scrubber where any particulate and chlorine gases are absorbed into the water before being exhausted to the atmosphere. On July 10 of this year, the Shirco unit demonstrated the capability of destroying dioxin-contaminated dirt to below 1ppb and we were not able to find any contamination in the exhaust gases, or in the dust from the air pollution control device.

There are two other technologies currently being evaluated at Times Beach that have not been previously mentioned. One is a hydrazine treatment process that is being evaluated by RMC Corporation in conjunction with Agro-K. A field test is being conducted to determine whether the treatment of contaminated soil with a hydrazine solution can decrease contamination through the chemical reaction of hydrazine with the contaminated soil. Another field test now being conducted by Parts Per Million is an organic extraction process where soil is being contacted with organic solvents to see if the dioxin molecule can be transported from the contaminated soil to the solvent so the solvent can be more readily treated than the contaminated soil.

All of these processes being tested at the dioxin research facility have been developed under the concept of providing the appropriate opportunity for private investors and researchers to develop and demonstrate their technologies.

Early in the process of identifying appropriate technologies, it became apparent that demonstration capabilities were needed. There were no other areas in the United States where people could demonstrate the capability for treating dioxin-contaminated soil. There were many proposals being initiated on different technologies, but there was no method to provide for third-party oversight. The Department of Natural Resources decided to do that and the dioxin research facility has proven effective for identifying two technologies for thermal treatment. We hope that by November of this year, some in-place treatment technologies will look promising. They undoubtedly will be more cost-effective and may be the appropriate technology for some sites. The philosophy utilized in this endeavor is not to have the State of Missouri involved in the research activities from a purely research standpoint, but to be involved in providing the appropriate resources for private researchers to do their work. It cost us approximately $300,000 to build this facility, and depending upon the number of users that we get, our hope is to recover the investment cost by spreading the cost out amongst the different researchers. However, we do not believe it is appropriate for the state to be funding the research activities for the private individuals and we also would not recommend that the US EPA fund private research activites for corporations operating in a potentially profit-making mode, should their solutions prove effective.

We would support, in general, the concept of the bill. We think it is appropriate to give EPA the authority to allow research at hazardous waste sites, and that by providing facilities for this research in the process of identifying alternative solutions, it is possible that more cost-effective treatment technologies can be developed.

Mr. STENHOLM. Thank you.
Next we will hear from Mr. James Welsh.

TESTIMONY OF JAMES NEAL WELSH, CHIEF EXECUTIVE OFFICER, SHIRCO INFRARED SYSTEMS, INC., DALLAS, TX

Mr. WELSH. Mr. Chairman, thank you; Mr. Smith.
In the interest of time, may I request that my statement be entered in total into the record.
Mr. STENHOLM. With no objection, your entire statement will be made a part of the record and we will appreciate brevity.
Mr. WELSH. Thank you.
Very quickly, my name is Jim Welsh and I am chief executive officer of Shirco Infrated Systems, Inc. of Dallas, and I am principal owner of that firm. I was very pleased to have the invitation to testify before this committee on this important issue because we have 10 years of experience as an innovative entrepreneur directly affected by the kinds of issues you are addressing with your amendment.

As a businessman, I heartily endorse your proposal, Congressman Stenholm, and the need to have innovation for Superfund sites, and further, I concur with you that the marketplace must become more competitive and could generate more cleanups if the regulatory system allowed for innovation and entrepreneurial businesses to participate and to demonstrate and to prove our effectiveness with new technology. I would reiterate Mr. Fortuna's earlier statement that a distinction needs to be made between application and pure R&D in order to encourage businesses to get into the task of cleaning up Superfund sites. The current CERCLA—Superfund Act—needs to be reauthorized with provisions that insure workable solutions to the issues of cost effectiveness, public health and safety in the disposal of hazardous waste.

As I stated, I have some background and experience in this. In 1976, we formed a startup venture to participate in the purchase of some patents on an innovative incineration process. I was convinced then that incineration offered an economic opportunity as well as a solution to some social and environmental issues. We learned very quickly that having unique and patented technology created some major hurdles—there were difficulties at being innovative.

In response to Congressman Smith's comment earlier, we learned that constraints are imposed if technology is not given due consideration before the regulations become codified. If the regulations become locked in and do not consider the innovative technologies that may come, then you are shut out. You also learn as a small business the lesson of time and its scarcity and the fact that time is money for a small businessman. Delays prevent cash flow from supporting your operation. And so we support the points you have made today. In listening to these, we feel very strongly that that is an issue that must be addressed in the new reauthorization.

As you stated in your opening statement, Chairman Stenholm, small firms do have the struggles facing innovative technologies and mine has been one of those. Until very recently, we have not found incineration to be a high, active interest market. It has been

less expensive to take the short-term solution: to throw waste in a hole. This has forced our firm to look for other applications and, fortunately, we have been able to work in low-level radioactive waste disposal, regeneration of active carbon such as used in purification of drinking water, and other type of hazardous applications.

Seeing what RCRA was doing in the reauthorization in 1984, I invested my firm's money in building the mobile pilot that you just saw pictured in Mr. Schreiber's slides. And we feel this is the only truly mobile system that is commercially available in the market today.

Through his kind and very generous offer, Mr. Schreiber was very insistent in having us come to demonstrate what he was hopeful would be cost-effective technology at Times Beach. We went at his very strong insistence and were able to demonstrate what we feel were very extraordinary results, and we have just received these test reports within the last 3 days. This hearing is our first opportunity to publicly release these results of which we are quite proud.

The independent testing laboratory that did the work reported that they were unable to detect any dioxin in either the soil or in the gas phase, at levels in detection below 38 parts per trillion. The gas emission—the dust emission—out of our system was under one-eightieth of the Federal standard. We feel that this conclusively demonstrates and substantiates our belief that if we can incinerate dioxin, we can incinerate any organic constituent.

I would point out that we paid for all of this testing totally at our expense with no Federal or State funding. In fact, we actually paid the cost for the State of Missouri to do their analytical backup and verification of our own test results which were done by two firms—ERT, Inc., of Concord, MA, and Roy F. Weston of Westchester, PA.

We are grateful to have had the opportunity to demonstrate this, and we appreciate that a program existed in the State of Missouri that offered a workable format for this kind of testing.

I agree with what Mr. Flax said earlier on the willingness of small businesses to take risk. We are willing to do it. What we are really asking for, and what your bill H.R. 3211 proposes, is really to give us a fair shake. Allow consideration of our technology.

Dioxin is a focal point of a lot of attention these days. It has been found in Love Canal and in Missouri. It is in New Jersey. It is all around the country. We feel that a mobile system, such as ours, which can provide a cost effective, onsite solution—that is, be very competitive with landfill—needs to have consideration and should be open to the review of people looking at how do you solve these problems.

In answer to your other question earlier, Congressman Smith, I can relate from direct personal experience in my organization, very frustrating feelings of trying to develop market opportunities where innovative technology is stifled by the lack of regulatory recognition. If they don't recognize that innovative technology is going to be part of the transaction—EPA guidelines frankly in the past have not been open to anything that comes down the path.

Let me be very specific for a minute. Our process is infrared, as in the name of our company, and we have no gas or oil-fired fuel in

our system. Therefore, we have no open flame; but technically the regulations say if you don't have a flame, you are not an incinerator.

Now, the only other problem is that the alternative is to call ourselves a high-temperature thermal treatment process, and we have been waiting years for regulation to be promulgated on how to even regulate high-temperature processes. So we call ourselves an incinerator, and we are more than glad to meet the rigid specifications and constraints on incineration. We were able to do this at Times Beach as demonstrated by our results. But the frustration of trying to react in the regulatory atmosphere, where innovation is not even given consideration, is very frustrating.

Now, protection of the public health and safety is absolutely paramount, and there must be some control over the innovation and technology that is applied to hazardous waste. You can't let every idiot with an idea go running off, half cocked, without control. There must be some clear guidelines to give Congress a way to screen and evaluate companies that have proven success without unduly impeding or delaying the implementation of the process.

Congressman Stenholm was absolutely correct in saying that timetables have to be required. As you commented, even if they have to tell us we can't do it in 60 days, they need some timetable. Otherwise, things continue to go on with study and review and delay. From the standpoint of a small business, that becomes an impediment, a discouragement and a disincentive to continue to look at providing innovative solutions to the problems.

We also feel that Congress needs to develop procedures allowing innovative technology to be applied later in the process of evaluation. Often the mindset gets made up early by the consultants. We have heard today from Dr. Hirschhorn that often the decision is made very clearly that this is the way to go and everything else that comes thereafter is foreclosed from entering into the process of consideration. That needs to be changed so that new incentives can be there to come up with more cost-effective answers to the problem.

Under the current guidelines also, we are finding that State and Federal agencies, as Mr. Hedeman said today, are frequently very unwilling to give due consideration to technology because it's proprietary or because it's from a sole source. And this is where I heartily endorse Congressman Stenholm's requirement that proprietary technology be absolutely allowed to be considered. Just because I have a patent on my process should not enable the world to foreclose me from providing a cost-effective solution. If I can provide a cost-effective answer in comparison to other alternatives, then I should be allowed an opportunity to shoot for it. We must have the openness of the marketplace.

The industry is evolving quickly at the present time, and as I address this committee today there is growing concern among your constituents about the serious threat to public health and safety posed by land disposal of waste. The previous solutions of taking waste from one landfill and hauling hundreds of truckloads to another leaky site is becoming less and less a viable political answer. An ultimate solution onsite would appear to be the practical answer. But it has never been done on a large scale.

The public, it seems, is starting to look for answers. I have, in my own company, received probably 30 calls over the last several months from people who say they don't want wastes being hauled in thousands of truckloads through their neighborhood. I think there is an openness in the public to look at onsite answers, ultimate disposal—whether it's Mr. Flax or mine or some other technology that has the solution to the problem.

Time has its ironies. In 1978, I explored the concept of mobile incineration with EPA officials here in Washington, DC, and I got no response. In fact, I was laughed at. Since early 1985, however, I have seen almost a total reversal of this, and we are in active discussions with organizations ranking from the State of Illinois to people like Bob Schreiber to private industries, to Superfund sites in which there is a concensus that mobile incineration is now a very viable concept. And even the EPA, through their mobile system, is strongly endorsing this concept.

In closing, there are proven innovative technologies for providing onsite solutions. As shown by Mr. Flax, myself and others, there are people out there willing to take the risk. We need to have less discouragement in terms of our participation. One of the things that was touched on earlier by Congressman Stenholm was the question of liability, and that is not only from the standpoint of the testing that is proposed under H.R. 3211 but also the longer term liability that small companies face when they go to a site.

This is a broader issue than this amendment [H.R. 3211], but I think it's encompassed in this whole issue of liability. It's ludicrous to think that a company that goes to a site to clean it up should be brought in jointly and severally after the cleanup is successfully done and made part of the problem of those that created the site in the first place. We can't stand that. It's a strong disincentive to the overall solution to the problems.

The second consideration that this amendment [H.R. 3211] should consider, and was not greatly discussed today, regards the permitting at the Superfund sites. I can admit from firsthand experience that this is an extremely confused issue. I have had meetings with the highest level of EPA officials in Superfund, and they have told me directly that you need no permits at Superfund sites, none. That is the law. I go to the State or the regional levels and they say that is hogwash. They don't know what Washington EPA is talking about. I go to private industry, and they say we don't know what in the world is going on. So there is tremendous confusion about what and where and how on the permitting. Since that is the longest single step in the cleanup process, there needs to be some identification and guidance established for EPA.

In closing, let me make my recommendations.

First, that this program [CERCLA] be implemented and reauthorized as quickly as possible to proceed with the important task of cleaning up our hazardous waste. As a native Texan, we know about and put a lot of value on our scarce water resources. We can't let Superfund timebombs continue to tick on and run the risk of the ultimate destruction of some of our scarce water resources. The issue of economic cost and public health and safety just aren't going to go away.

Second, whatever new law Congress imposes, and hopefully through this amendment [H.R. 3211] we can see some reduction in the restrictions that impede or delay implementation, priority should be put on cleaning up the sites instead of studying, where most of the money has been spent today.

Third, the Superfund Act should contain provisions, such as H.R. 3211, that will make the process easier for the application of new and innovative and cost-effective technology, not necessarily new R&D but new applications.

There needs to be guidelines, rigid guidelines from Congress to EPA to use cost effectiveness in the long term. We have heard time and time again by several of the panels today, that the short-term solution is not the cheap solution and often creates more problems through the risk of transportation and future leaky sites.

I feel very strongly, as H.R. 3211 requires, that innovative and proprietary technology at least be given due consideration. There should be some balance in there so that true, hard research at the academic level should be separated from people like Mr. Flax and myself, who have proven demonstratable technologies.

And finally the question of liability must be resolved. The problem solvers can't continue to bear the burden with those that cause the problem or you will just shut us out of business. My resources are limited. I don't have the ability to carry the problem for everybody. I think part of the problem has been that Congress has not been direct enough with the EPA. EPA needs to be told if the Congress wants on-site disposal, give them that direction. Don't make the choice theirs, because they have studied and reviewed and continue to look for shorter range solutions.

Basically, we feel that the answers are there. I am willing to take the risk but give me an opportunity to demonstrate what we can do and give me an opportunity to bid on a fair and competitive basis, on a cost-effective basis for the cleanup work that this country so vitally needs.

Mr. Chairman, I thank you.

Mr. STENHOLM. Thank you, Mr. Welsh.

[Mr. Welsh's prepared statement, with attachments, follows:]

PREPARED STATEMENT OF JAMES NEAL WELSH, CHIEF EXECUTIVE OFFICER, SHIRCO INFRARED SYSTEMS, INC.

Mr. Chairman, distinguished Members of the Subcommittee on Energy, Environment and Safety. My name is Jim Welsh, and I am the Chief Executive Officer and principal owner of Shirco Infrared Systems, Inc., of Dallas, Texas. I was very pleased to be invited to testify before this Subcommittee on an important issue regarding reauthorization of the Superfund Act. I am an entrepreneur who for 10 years has directed an emerging business with an innovative technology and with experience that directly relates to the amendment proposed by Chairman Stenholm. As a businessman, I embrace Congressman Stenholm's position on the need to find and implement innovation for cleanup of Superfund sites across the country. Further, I concur with his statement that the marketplace should be more competitive and could generate more permanent cleanups if the regulatory system allowed innovative and entrepreneurial businesses to demonstrate and prove the effectiveness of new technology.

To encourage businesses to aid in the task of cleaning up Superfund sites, the current Comprehensive Environmental Response, Compensation, and Liability Act must be reauthorized with provisions that ensure workable solutions to issues of cost effectiveness, public health, and safety in the disposal of hazardous waste in America today.

As a way of addressing these issues, let me briefly relate my experience and background, and explain its relevance to my testimony today. While working on my Masters Degree at Harvard Business School in 1968, I was first introduced to the field of incineration, which had not been covered in my chemical engineering undergraduate work. From a study I conducted at

Cabot Corporation in Boston, I gained a very strong belief that incineration could be performed safely and cost effectively to provide a significant solution to waste disposal problems. The economics of waste disposal in the late 1960's was not a major issue of national concern. Thus, the Cabot Corporation was not encouraged to pursue development of its technology base into this field.

Later, after working in investment banking with numerous emerging companies, I was offered the opportunity in 1976 to participate in the purchase of some existing patents on an innovative incineration process. I drew from my previous experience and interest in the field, and formed a new startup venture in this area. I was still convinced that incineration offered both economic opportunities as well as solutions to social and environmental issues confronting the nation in the future.

The technology we acquired in 1976 was unique and patented. The process encompassed a range of high temperature applications, and overcame many of the problems with air pollution and cost efficiency experienced by competitive incinerators on the market at the time. The most immediate application for our equipment in 1976 was in the municipal sludge disposal market, which was stimulated by funding under the Federal Construction Grants Program; and there was a viable and ready market for the technology. However, we found at that time, that being "innovative" presented difficulties.

We learned that constraints are imposed if technology is not given due consideration before regulations become codified. We also learned the valuable lesson that time is the most scarce resource of any emerging business. Time to an entrepreneur means payroll, overhead, rent and other costs of keeping the doors open; and bureaucratic delays simply prevent cash from flowing in to support the operation. Many small businesses are simply unable to stay in the race. This was the case with the predecessor to our organization. They conceived and developed a relevant technology; however, they were unable to weather the extended delays in the Construction Grants Program.

My firm has known the struggles facing innovative technologies. We have had the vision of incineration as a long-term solution for waste disposal, but until very recently incineration has not been an active market. This has forced us to find other opportunities and applications for our technology. These have included research and sales of full-sized systems to DuPont for low-level radioactive waste volume reduction at the Savannah River Laboratory in Aiken, S.C.; and regeneration of activated carbon used in purifying drinking water in Jefferson Parish, Louisiana, and New York City. We have also performed tests and supplied equipment for hazardous waste and contaminated soils. Seeing the long range impact of the New Resource Conservation & Recovery Act of November 1984, I invested my resources in late 1984 to building a full-scale mobile pilot system, which presently is the only truly mobile pilot commercially available in the marketplace today. With this unit,

we are able to go to plants around the country and demonstrate the effectiveness of our innovative technology in solving on-site disposal needs.

It was through this work that we met Mr. Robert Schreiber, Director of the Department of Environmental Quality for the State of Missouri. At his insistence, we agreed to bring our mobile system, at our full expense, to the Times Beach Dioxin Research Facility in July 1985, where our engineering staff performed on-site trial burns on the dioxin contaminated soil. Under the closed process control that is basic to our system, we were able to demonstrate extraordinary results on these samples. We have just received the official test report and this hearing is our first opportunity to publicly release the results, of which we are quite proud. The independent testing laboratory, that was used to verify the samples, has reported that dioxin was not detected in the dirt after processing in our system; and the detection level was at 20 parts per trillion. This is below 2% of the one part per billion (1ppb) level recommended as safe by the Center for Disease Control. Equally significant, we were able to demonstrate our process efficiency by totally destroying the dioxin in all of the gas samples which were collected. These showed Destruction and Removal Efficiency in excess of 99.999997% which exceeds the 99.9999% DRE the RCRA standard for dioxin incineration since July 15, 1985. The particulate emmissions observed in our tests were less than 1/80th of the 0.08 grains per dry standard cubic feet. These independent test results have substantiated our belief that if we can incinerate dioxin, we can incinerate any organic contaminant.

I would point out again that we performed this test totally at our expense with no state or federal funding. In fact, we actually paid costs to the State of Missouri for their analytical testing which was conducted by the University of Missouri at Columbia to verify our own test results which were performed by ERT, Inc. of Concord, Massachusetts, and Roy F. Weston, Inc. of West Chester, Pennsylvania. We were very pleased to have this opportunity to demonstrate our process capabilities, and we appreciate the program in the State of Missouri which offers a workable format for this testing. We were confident in what we could do on a wide range of materials and felt that we could demonstrate a cost-effective, on-site solution for this very difficult problem in Missouri.

As members of this Subcommittee may be aware, dioxin has increasingly become recognized as a major problem across the country, and it knows no constituency barrier. Our truly mobile system permits on-site cleanup; our distinctive infrared process ensures safe and economical disposal.

From direct personal experience in my organization, I can recall the frustrations of trying to develop market opportunities where innovative technology was stifled by lack of regulatory recognition. Very specifically, our unique infrared process requires no fossil fuel and therefore has no direct open flame, and that is one of its key advantages. Legislation enacted by Congress and enforced by regulatory authorities has recognized only gas or oil-fired incinerators. Since our process has no direct fossil fuel or open flame, we technically fall outside

the formal definition of an incinerator. The other category for high temperature equipment is "thermal process system"; and we have been waiting years for release of official EPA guidelines on how they intend to regulate such systems. This lack of regulatory clarity has impacted our company in its marketing efforts.

Protection of the public health and safety is paramount; and to that end some control over innovation and technology regarding hazardous waste processing is required. Some method should be devised by Congress, however, that would provide the EPA with clear guidelines to screen and evaluate those companies with proven technical success in this area without impeding or unduly delaying implementation in resolving this national issue.

In addition, Congress needs to develop procedures allowing proven technical innovation to be considered later in the evaluation phase on specific pit cleanup planning. Too often, decisions are made very early in the planning process, based on familiar technology; and this provides a disincentive to innovative firms which may be able to offer a better solution before the actual site work is performed. Under current guidelines, state and federal agencies are frequently unwilling to give due consideration to new technology out of concern or fear of "recommending or endorsing a sole source supplier." Provided the long-term cost-effectiveness of the innovative process or equipment is competitive with other alternatives, proprietary technology should <u>not</u> be disregarded or eliminated from consideration solely because there is only one supplier.

Until just recently, the costs for land disposal of wastes have been very low and there has been limited public awareness of the potential threats from Superfund and hazardous waste disposal sites. However, this industry is evolving quickly as these conditions have changed. Today as I address this committee, there is growing concern among your constituents about the serious threat to public health and safety posed by land disposal of wastes. The almost daily release of information on the finding of new Superfund sites; industrial hazardous waste accidents; and other related items are making all of us more sensitive to environmental issues.

In addition, the new RCRA regulations from November 1984 are forcing land disposal costs to accelerate. The previous solutions to pit cleanups of hauling hundreds of truckloads of waste from one pit to another site, which may develop a future leak, is becoming a less viable political answer. Ultimate disposal on-site would appear to be the most practical solution; but this has never been done on a large scale. Mobile incineration is the key. Because of our product's unique design, we can move very large systems, fully assembled, by truck and have delivered nearly 40% of our sales around the world in such fashion.

Time has its ironies. In 1978, when I explored the concept of mobile incineration using our equipment with the EPA in Washington, I found no positive response. Since early 1985, however, we have seen a total reversal of this and we are in active discussions with a number of separate organizations, from

State EPA agencies to private firms with multiple plant pits; and the general consensus is that mobile incineration is now a very viable alternative. Even the EPA has strongly endorsed this concept.

There are proven, innovative technologies for providing various on-site treatments for disposal of hazardous wastes but there is a need to address several issues that could otherwise discourage the participation of innovative firms. One of the concerns is the issue of liability. It is essential, for cost-effective cleanups, that those companies involved in solving problems at hazardous sites not be penalized and held liable for the site after their work is successfully completed. It is unreasonable to expect emerging firms to have the financial resources to provide the bonding, insurance, and other financial requirements that are required for Superfund activities, if those solving the problems are later included in lawsuits with those entities which caused the problems.

A second area for consideration in Congress is the question of permitting at Superfund sites. I admit from firsthand experience that this is a very confused issue at this time. From EPA officials, at the highest level, I have been told directly that permitting at Federal Superfund sites is not required under CERCLA. However, at State and local levels, this is neither accepted nor understood; and the question of privately funded sites is even less clear. Since the permitting requirement can be the single longest step in the process of cleaning a Superfund site, more attention by Congress in the reauthorization of CERCLA should be given to this issue.

In closing let me summarize my recommendations concerning the proposed CERCLA legislation. First, the program must be reauthorized and the important task of actual cleanup commenced. The issues of economic cost, public health and safety will not go away. Second, the new law must not impose restrictions or conditions that impede or delay implementation. Priority should be focused on the actual cleanup efforts and not diverted by extended review processes.

Third, the Superfund Act should contain provisions that will make the process easier for application of new, innovative and cost-effective technology. Guidelines must be established by Congress to direct the EPA to use cost-effectiveness on a life cycle (long-term) basis as the means of evaluating technologies. In addition, provisions must be included that permit the application of proprietary technology to be used. At the same time, a distinction must be made between true research and the application of proven technology to a new problem. The issue of liability must be more clearly resolved. The "problem-solvers" should not have the burden jointly and severally with those entities which create the problem.

Fourth, Congress should direct the EPA to give priority to on-site cleanup over off-site treatment or disposal. The issues of increased risk fom transportation and the ultimate fate of hazardous materials favor on-site solutions. In order to facilitate on-site cleanup, Congress needs to provide the EPA

with more clarification and direction relative to permitting requirements. If it continues to take 12 to 18 months for permit decisions, the overall effort and the solution to problems will be extended at additional economic cost.

It is my hope that my testimony before this hearing today can provide a factual basis for an evaluation of the mechanics of this proposed amendment. The nation needs an active program that will immediately commence the massive effort of cleaning up the staggering threat from abandoned hazardous waste sites; and we need a new law that will provide a manageable framework for innovation that is presented with clarity and consistency.

Thank you.

Shirco Infrared Systems
incorporated

(214) 630-7511

September 9, 1985

Honorable Charles W. Stenholm, M.C.
B363 Rayburn H.O.B.
Washington, D.C. 20515

Dear Congressman Stenholm:

I was very pleased to have the opportunity to meet you and testify before your Sub-Committee on Energy and Environment this past week. As an entrepreneur with proprietary, innovative technology, I have directly experienced the problems that your proposed HR3211 addresses. As I stated in my testimony, I fully support and endorse your intentions with this Bill. There is an urgent need for innovative technology to not only be recognized but utilized in the massive effort required for cleanup of Superfund sites.

I would suggest that several of the points made during the hearing last week should be given consideration in your Bill. First, the EPA needs specific, firm guidelines and deadlines, as well as more clear cut definitions on several general terms. For instance, cost effectiveness should be specifically defined and should direct focus on long term solutions. In addition, the EPA should be told specifically that they can utilize proven, proprietary technology, if it can demonstrate that it is competitive on a cost effective basis with other alternatives. You heard Mr. Hedeman testify that the EPA "cannot use proprietary technology since competitive bidding is required". While the government's interest must be protected, there are ways to structure the contract bid and negotiation so that proprietary technology can be evaluated on a fair and equitable basis.

I am most anxious to provide any further support that I can for your amendment. If I can provide any further assistance or information, please feel free to have your staff contact me directly. I look forward to a successful passage of the Superfund reauthorization and the addition of HR3211. Thank you again for allowing me to provide input on this important issue.

Sincerely yours,

Jim Welsh
President

JW/sc

1196 Empire Central Dallas, Texas 75247-4301

FOCUS ISSUE

Infrared rays create red-hot profits

By Beth Ellyn Hansenbal

What do the makers of Tanka, the users of plutonium and big cities with tons of municipal waste have in common? All use an infrared ray method of incineration to dispose of their unwanted byproducts.

A Dallas company, Shirco Infrared Systems, is becoming the national leader in this waste technology. Companies with diverse manufacturing processes all have waste products which must be disposed of — without sending a vast amount of pollutants up the smokestack to the chagrin of the Environmental Protection Agency.

Lately Shirco has been called up to solve some national disasters. When the state of Missouri hired a contractor to spray the state's dusty roads with oil, tragedy struck when the oil contained dioxin, the cancer-causing agent found in Agent Orange. Ground surrounding the town of Times Beach contained 250 parts per billion of dioxin. The World Health Organization says a safe exposure to dioxin is any under one part per billion.

The state called Shirco in [illegible] the soil. In Italy the company's mobile truck rolled out of its Empire Central dock and headed for Times Beach. Results have been so encouraging, says James Welsh, Shirco president, that Shirco has been contracted by the state of New York to help it with its Love Canal clean up.

The technology is relatively simple. Welsh compares the dumpster-like incinerator to a large pizza oven. The incinerator is a long insulated box with a conveyor belt at its floor. The waste moves along the belt where it is exposed to the very high temperatures of infrared rays.

Shirco is able to control the gas flows by limiting the amount of oxygen in the chamber. Oxygen is necessary for combustion. "The combination of high heat and oxygen-control produces a very controllable incineration process," says Welsh.

Ten years ago, with Burt Bright as his partner and backer, Welsh bought the infrared patent. The company first concentrated its efforts on sewage sludge. It would visit municipalities, demonstrate the efficacy of its system, then build, install and maintain it for its customers. But when federal funding for these machines dried up in 1981, so did Shirco's sales volume.

Forced to seek new applications, the company branched out.

Its first new market was companies which use activated carbon. This kind of carbon acts like a sponge. Sugar manufacturers use it commercially to remove the brown color from cane sugar.

Activated carbon, however, is a very expensive purifying agent. "At current prices users can't afford to throw it away," reports Welsh.

Sugar refiners now place their carbon in the Shirco box which regenerates it thermally. "It's like squeezing the sponge," explains the president.

Activated carbon is also widely used in purifying drinking water. "The U.S. EPA is one of our best customers," says Welsh. Municipalities are also passing the customer tax for water purification. Shirco is currently shipping a unit, which costs from $150,000 to $3.5 million, to the city of New York.

Shirco has also bribed its units to the floor of coffee makers in West Germany and Saudi Arabia. The manufacturers of caffeine-free products use the activated carbon to remove the offending caffeine from the coffee beans.

Shirco ventured into the chemical removal business in 1983 when it was approached by DuPont. The chemical manufacturer had a major disposal problem. Its laboratories use photoresists. Law requires everything that comes in touch with photoresists be disposed of. "They have a staggering amount of waste — rubber gloves, glass beakers, papers. We not only had to remove the waste, but also ensure we were not sending pollutants into the air," Welsh says.

The infrared process is well-suited for nuclear waste disposals, says Welsh, because it produces very little gas which send the plutonium into the air. At the same time it can reduce a 55 gallon drum of waste into a pile of ash that can sit in a medium-sized ash tray.

Last summer Welsh took $300,000 out of his pocket and built a mobile infrared incinerator. He felt if the company could drive its cost into a place and run some of the plant's waste through the incinerator, he would immediately have a new customer. The nation's only other mobile incinerator belongs to the EPA. Welsh proudly points out its mobile unit cost taxpayers $8 million.

"I realized if I took the solution to the problem, I'd have a lot more business. That mobile unit has been the smartest business move I've ever made," says Welsh.

Missouri called Shirco because of the availability of its mobile unit. "We started processing dirt four hours after we arrived. We ran the incinerator for three days, then sent samples over to the lab," says Welsh.

Welsh is confident about the company's future. For years it dredged along as obscurity, taking care of sewage sludge. Now it is on the forefront of technology, solving one of the nation's thornier problems, the removal of nuclear waste. Welsh believes Shirco is now an end but as its burners. [illegible]

James Welsh and Brent Rush suit up.

Dallas/Fort Worth Business Journal
Focus Issue - Texas Technology

August 19, 1985

56-465 O—86——4

DATA SUMMARY
OF
ON-SITE INCINERATION TESTING
AT
TIMES BEACH DIOXIN RESARCH FACILITY
TIMES BEACH, MISSOURI
BY
SHIRCO INFRARED SYSTEMS PORTABLE UNIT

During the period of July 8 through July 12, the Shirco Infrared Systems Portable Unit was on-site at the Times Beach Dioxin Research Facility to demonstrate the Shirco technology capability to successfully decontaminate soil laden with 2,3,7,8 tetrachloro-dibenzo-p-dioxin (TCDD). Equipment set-up, preliminary operation, test operation, decontamination and take down was included in this period. Operation of the furnace system to decontaminate the dioxin laden soil, and sample emissions and feed and discharge streams was accomplished on July 10 and 11. The Missouri Department of Natural Resources Environmental Division coordinated the site preparation. Emissions sampling and final analysis was performed by the Environmental Research & Technology Company (ERT) while laboratory analysis of the emissions and soil samples was performed by Roy F. Weston, Incorporated. Shirco Infrared Systems prepared the test protocol and operated the furnace system.

It is concluded that the testing performed by Shirco Infrared Systems using the Portable Test Unit has proven the process and technology to be a successful method of decontaminating the dioxin laden soil present at Times Beach, Missouri. Presented below is a summary of the results of the testing performed. An expanded report may be obtained from Shirco Infrared Systems, Inc., 1195 Empire Central, Dallas, Texas 75247-4301; (214) 630-7511.

TEST RESULTS SUMMARY

	EPA STANDARD	30 MINUTE RESIDENCE	15 MINUTE RESIDENCE
Composite feed soil 2,3,7,8 TCDD concentration		227 ppb	156 ppb
Composite discharge soil 2,3,7,8 TCDD concentration	< 1 ppb	Not detected at 38 ppt	Not detected at 33 ppt
Particulate emissions at 7% O_2	0.08 gr/dscf	0.001 gr/dscf	.0002 gr/dscf
Gas phase DRE of 2,3,7,8 TCDD	≥ 99.9999%	> 99.999996%	>99.999989%

SHIRCO INFRARED SYSTEMS, INC
Corporate History

The SHIRCO story began with two engineers' dissatisfaction with conventional wastewater sludge incinerators. The engineers, Craig Smyser and Jim Hobbs, decided to design a new incinerator from a "clean sheet of paper". The design would be based on existing, commercially available components and manufacturing techniques, with the following goals:

- simplicity of design
- ease of fabrication, installation, and maintenance
- economical operation
- low cost, consistent with good design practices
- efficient use of energy
- low emissions

The resulting incinerator used infrared energy (first in the form of quartz lamps and later using silicon carbide heating elements), fiber blanket insulation, a high temperature metal belt to convey the sludge through the incinerator, modular construction, and multiple-zone temperature control. Major maintenance items were located external to the furnace itself.

Patented Infrared System

The two engineers then formed SHIRCO (Smyser-Hobbs InfraRed Company) in 1970. Engineers specializing in mechanical design and wastewater processes were then added, providing a total of over fifty years of engineering experience and professional engineering licenses in ten states. A patent for the infrared incinerator was granted in 1972 by the U.S. Patent Office. Subsequently, patents were obtained in Great Britain, West Germany, Japan, Canada, France, Sweden, and Switzerland.

In 1975, SHIRCO became active in the EPA Municipal Wastewater Treatment Works Construction Grants Program (commonly referred to as the Construction Grants Program), which provides funds for municipalities to improve and expand water treatment facilities. A contract was received under the program for a five hundred pound per hour (500 lb/hr) sludge incinerator for the city of Richardson, Texas, a suburb of Dallas. The unit was installed and operated in 1975.

Between 1976 and 1983, SHIRCO installed over thirty electric infrared furnaces in the United States and overseas, as shown in the attached installation list. Among those installations, the Plana (first multiple incineration unit system - 1977), CIBA-GEIGY (first combination sludge incinerator/carbon regenerator - 1979), New Jeddah (first overseas installation - 1980), and Dupont Savannah River (first radioactive waste incinerator - 1983) units are notable.

SHIRCO was contacted in late 1982 by E.I. DuPont Co., operating contractor for the U.S. Department of Energy's Savannah River Laboratory (SRL) in Aiken, S.C. DuPont contracted with SHIRCO to perform incineration tests on simulated low-level radioactive waste. The actual waste consisted of protective clothing, containers, and cleaning supplies contaminated with plutonium. An incinerator system was delivered in November, 1983, and is currently in start-up.

Portable System - Hazardous Waste Need Not Be Transported

The SHIRCO Portable Pilot System was developed in response to the U.S. EPA Hazardous Waste Management Regulations ("RCRA regs"). These regulations have made transport of hazardous materials to SHIRCO's Pilot Test Facility in Dallas, Texas, difficult and expensive. It was determined that the market existed for a trailer-mounted waste disposal system, which could be brought to waste-producing or waste storage sites for thermal process testing. The construction and process functions of the furnace are identical to the full-scale Infrared Furnace.

The Portable Pilot Test Unit is designed to demonstrate the performance of the SHIRCO Infrared Furnace in a variety of thermal processing applications. The system consists of a feed metering system, infrared primary chamber, a combination gas-fired/infrared secondary chamber, and offgas handling, data acquisition and control systems and heating element power centers (HEPC's), all enclosed in a 45'0" van trailer.

The first test was conducted in December, 1984, in Belvidere, N.J. The material incinerated was non-hazardous wastewater treatment sludge resulting from pharmaceuticals manufacture. The test included continuous monitoring of particulate and gaseous stack emissions, ash quality, etc. The final test report has just been released, and the data shows the SHIRCO system can meet all applicable emissions requirements at both the state and federal level while producing ash of suitable quality for disposal in a sanitary landfill. Incidentally, a temporary operating permit for the test was obtained from the New Jersey Department of Environmental Protection within one month of the application date.

The second test, completed in January, 1985, in Massachusetts, demonstrated Shirco's capability to pyrolyze chromium-bearing treatment plant sludges. Thermally fixing chromium in the stable trivalent state will allow the sludges to be safely landfilled. A growing concern in the northeastern U.S. is that catalytic agents in landfill soil will oxidize chromium to the carcinogenic state, which is leachable should groundwater penetrate the landfill cell. Pyrolyzing the sludge creates a carbon matrix in the ash, which keeps the chromium in a reduced (trivalent) state after landfill. Hydrocarbon-bearing offgases from the furnace can be incinerated in an afterburner or routed to the facility power boiler to produce electricity. The enclosed results of EP toxicity testing on the ash showed leached hexavalent chromium levels of one percent (1%) of the allowable value.

Recently a third test was performed in the unit, incinerating soil containing pentachlorophenol (PCP) and creosote. Initial results are very encouraging; a PCP level of one percent (1%) in the feed material was reduced to less than two parts per billion (2ppb) in the residual ash. Destruction and removal efficiency (DRE) data from the test will be available by mid-May 1985.

In addition to the tests already completed, Shirco has tests pending in Illinois, Louisiana, Maine, Mississippi, Missouri, New Jersey, and Pennsylvania this year. Materials to be tested range from grinding muds from ball bearing manufacture to soils contaminated with solvents and dioxin.

BEST COPY AVAILABLE

Mr. STENHOLM. Mr. Smith.

Mr. SMITH. One quick question. I know you are under time constraints, Mr. Chairman. Just a technical question of curiosity.

Where you are looking, if you take a few cubic feet of soil, obviously you can test it and find that you can incinerate it. What about at Times Beach where you have literally acres of toxic substance; is it economically feasible, and can you do it? What kind of time constraints are we looking at? Obviously we have never done it to that extent. We are now in the very preliminary stages. But just out of curiosity, can we do it?

Mr. SCHREIBER. I think what we are doing in Missouri is looking for both a short-term and long-term fix. We are cleaning up sites like in the Baker area and at Quarles Run, to where we are excavating the material and putting them into storage with the commitment that some technology, be it mobile incineration or fixed incineration or another type of technology, could come forward and destroy it.

During that time period we are looking at some of these in-place treatment technologies because, to be honest with you, they would be the most cost-effective for an area like Times Beach, where you have got 800 acres and potentially 150 to 200,000 cubic yards of contaminated material to deal with, that you can afford to take 5 years if some in-place treatment technology comes along, if that will work.

If it doesn't work, we are 5 years down the road and you are going to have to go back and do something else. But during the interim some of these other technologies are going to be very cost-effective for the areas that we had to excavate, and they should be done as soon as possible and we need to get along with it.

Mr. WELSH. Very quickly, in answer to your question, yes. In our system, we have had 10 years of operating experience in things from sewer sludge to radioactive waste, hazardous waste, and activated carbon, et cetera, so we know what our process will do. With our mobile pilot, we now know, really, the design conditions under which we would have a full-scale system.

We are working with the State of Illinois on a full-scale system, several paper companies who have creosote-pit problems. The number of pits around the country is staggering. I think Dr. Hirschhorn briefly touched on the volume. There are tens of thousands of potential pits out there, and mobile incineration we think is a very viable answer. This is where having an opportunity to demonstrate it on things like dioxin are key, and it was an incentive that the State of Missouri offered that this proposed amendment, H.R. 3211, does provide that kind of demonstration opportunity for firms with proven technology. You know mine is not something new.

Mr. SMITH. In terms of the technical way you go about it, you literally have to take every cubic yard of the 800 acres of Times Beach, MO, and heat that? You literally have to do that?

Mr. SCHREIBER. You would have to excavate the streets in Times Beach and heat it up to those kind of temperatures, and we are talking about excavation costs on cubic yard just getting out of the ground are going to be in excess of $100 a yard, and then you are looking at thermal treatment ranging anywhere from $700 or $800

dollars a cubic yard and then testing to certify that it's clean and by testing protocol that is going to meet the quality assurance programs.

Mr. SMITH. You have to remove your trees, buildings, any man-made objects; they have to be removed and destroyed as well, right?

Mr. SCHREIBER. Yes; and incinerating reinforced concrete becomes very difficult but you have to try and grind it down. But you can do it.

Mr. SMITH. You are saying you can do it?

Mr. SCHREIBER. You can do it at a cost.

Mr. WELSH. Times Beach is different than a lot of pits. A lot of pits are just open holes with soup. Times Beach is a much broader range of problem and I think what Mr. Schreiber has said—and we are in discussions with him—on potentially offering a service for the on-site incineration of the soil on selective sites where 20,000 or 40,000 cubic yards can be more readily handled, where you just simply excavate and scoop up the road and put it back on the road. So it's more site specific, but it can he done.

Mr. SMITH. Thank you.

Mr. STENHOLM. Thank you both for very excellent testimony that seems to prove the theory of H.R. 3211, which has already worked to some degree out at the State level where there exists a spirit of cooperation. Thank you for testifying and giving your opinions on the merits of this particular legislation.

In the interest of time, I will defer further questions we may have for you in writing as we enter into the legislative arena. Thank you very much.

Mr. STENHOLM. Our last witnesses are Mr. Carl Schafer, Jr., Director, Office of Environmental Policy, U.S. Department of Defense, and Mr. Gary Dunbar, vice president, Camp Dresser & McKee Inc., Annandale, VA. We will first hear from Mr. Carl Schafer, Jr.

TESTIMONY OF CARL J. SCHAFER, JR., DIRECTOR, ENVIRONMENTAL POLICY, OFFICE OF ASSISTANT SECRETARY OF DEFENSE, ACQUISITION AND LOGISTICS

Mr. SCHAFER. Thank you, sir. In the interest of brevity, I have submitted my major testimony for the record. I will summarize it.

Mr. STENHOLM. Without objection, your entire statement will be made a part of the record. We would appreciate your brevity as to the specifics of the legislation.

Mr. SCHAFER. Thank you. I must describe to you the interest of the Department of Defense on the subject at hand. We estimate that in the end we will have spent some $5 to $10 billion to clean up inactive dumpsites on military installations totaling some 600 sites perhaps.

Mr. STENHOLM. $5 to $10 billion?

Mr. SCHAFER. $5 to $10 billion, as in billion.

These 600 sites will include at least 39 now proposed for the NPL, national priorities list. We don't expect that figure to go much higher, but nonetheless it gives you a feel for the size of it. We feel the need for the development of cost-effective and innova-

tive technology for both cleanup, and for that matter for the disposal of current generations of hazardous waste, and are spending in fiscal 1985, $12 million to promote the development and demonstration of those types of technologies. These efforts are being carried out at Army, Navy, and Air Force environmental laboratories, in contract and consort with private industry.

Furthermore, we have recently stepped up our efforts to develop and deliver this kind of technology by reviewing with EPA where the DOD cleanup sites might be offered up as test beds, as it were, for the demonstration of technologies. In so doing, we have identified 15 ongoing activities and 16 new activities on 24 DOD installations where we can jointly mount these demonstration programs and will do so. The total of that program will involve some $23 million over the next 5 years. That is just a small part of the program but is an important effort to join up with EPA and to accelerate the pace of technology development.

With respect to the specific aspects of the bill, I must defer to my colleagues at EPA who are much more into the ins and outs of how the matter should precisely be handled. But let me offer some observations.

First of all, you have had very, very good advice from the last two witnesses, from the State of Missouri and Mr. Welsh. They speak with a sure knowledge of having been there and done it themselves. We are in pretty much the same boat since the Department of Defense is also a member of the regulated community in terms of trying to get the sites cleaned up. I assure you that if we add much more bureaucracy to the process, it is going to take many more years.

Everything that we can do to bring reality to the process—the elimination of bottlenecks, the elimination of bureaucratic practice, and the encouragement from the management point of view of the need—we should do.

I support, as do, I believe, the people from EPA who were here just earlier, the concept of your legislation. We must bring forth this underdeveloped resource for the wellspring of technology development represented by American small business. We have got to bring them into the game.

So, in short, this approach of encouraging innovative technology for the cleanup of hazardous waste is something that I am pushing, where I can, in my department. We are working with EPA, and quite productively so. We should do everything we can to spur it on.

Thank you.

[Mr. Schafer's prepared statement, with attachments, follows:]

PREPARED STATEMENT OF CARL J. SCHAFER, JR., DIRECTOR, ENVIRONMENTAL POLICY, OFFICE OF ASSISTANT SECRETARY OF DEFENSE, ACQUISITION AND LOGISTICS

INTRODUCTION

Good morning, Mr. Chairman and members of the Committee. It is an honor and a pleasure to appear before you and have the opportunity to address some of the provisions of H.R. 3211.

In order to focus on the issues I understand are of immediate interest to the Committee, I will limit my testimony to those sections of H.R. 3211 which are relevant to the DoD hazardous waste cleanup program. However, to ensure sufficient background information is available to the Committee, I'd like to provide a primer on DoD's hazardous wastes sites cleanup program for the record.

BACKGROUND

On August 14, 1981 the President signed Executive Order 12316, thereby delegating certain authority specified in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to the Secretary of Defense. The Secretary was given responsibility for DoD facilities and vessels for response actions (i.e., removals and remedial actions) for:

- Investigation, monitoring, survey, and testing, and
- Such planning, legal, fiscal, economic, engineering, technology development, architectural, and any other studies or investigations as necessary for response actions, cost recovery, and to enforce the provisions of CERCLA.

This delegation was based on a recognized expertise in chemical waste management within the Department. The Department solicited EPA's assistance and initiated a Memorandum of

BEST COPY AVAILABLE

Understanding with EPA to obtain their review of our cleanup actions at National Priority List sites.

The Department of Defense believes that the Congress has acted wisely to establish the Defense Environmental Restoration Account. We are pleased to play a leading role in the national effort; we are proud of what we have accomplished; and we enthusiastically accept the challenge to do more. The benefits of DoD participation go far beyond providing places where our people can live and work more productively and will benefit the quality of life for our neighbors and the whole nation.

PROGRESS ON TECHNOLOGY DEVELOPMENT

The Department of Defense is interested in finding and applying innovative technology to permanently treat hazardous wastes at our installations. The Air Force Engineering and Services Center in Panama City, Florida; Army Toxic and Hazardous Materials Agency in Aberdeen, Maryland; and Navy Civil Engineering Laboratory in Port Hueneme, California, are among the DoD laboratories concerned with developing and demonstrating these technologies. Unlike current Superfund programs, our Installation Restoration Program to clean up DoD hazardous waste sites has a discrete program element for the development of technology for remedial actions. Last year we spent about $12 million in such efforts, generally through laboratory contract efforts.

We have recently stepped up our efforts to develop cost-effective technologies. In mid-April of this year, Dr.

BEST COPY AVAILABLE

Bernard D. Goldstein, then Assistant Administrator for Research and Development at EPA, and I directed that a joint DoD/EPA working group be established. The purpose was to explore joint interests in demonstrating hazardous waste technologies for cleanup of former hazardous waste disposal sites.

Results of our working group are shown in Table I. Of the 31 total projects shown, 15 are in progress while 16 are new, previously unrecognized cooperative opportunities. Additional descriptions of each project in Table I are available in a recent DoD/EPA publication.* This plan includes efforts at 6 Army, Navy and Air Force research laboratories, 6 of EPA's 14 research laboratories, and demonstrations on-site at 24 candidate DoD installations. The best ideas of small business and others form the backbone of many of these contracted efforts.

IMPACT OF HOUSE BILL 3211

I have long believed that private industry, and in particular small business, has tremendous creative capacity to produce "high-tech" solutions as they have in the personal computer fields. No provision of this bill will adversely affect the Department of Defense and our programs to clean up currently active and formerly owned DoD installations.

---

*Footnote: "Report of the DoD/EPA Working Group to Explore Hazardous Waste Cleanup Demonstrations," available from the Director of Environmental Policy (Installations), Office of the Secretary of Defense, OASD(A&L), The Pentagon, Room 3D833, Washington, DC 20301-8000

BEST COPY AVAILABLE

I would like to add that, with or without this bill, I see EPA making excellent progress to develop and demonstrate cost-effective cleanup technologies. As more and more Superfund sites reach the remedial action stage, there will be a tremendous drive to apply and improve such technologies. We are therefore not sure this bill is necessary. We recognize it could cause administrative problems for EPA and consequently we defer to EPA as the agency most affected by the bill.

CONCLUSION

We pledge to work with EPA and private industry to help foster innovative technology which will lead to the cost-effective cleanup of hazardous wastes. We are also prepared to nominate DoD installations where cleanups are needed and which can be used as demonstration sites for EPA's evaluation. Thank you for the opportunity to express my views and I will be glad to answer questions.

TABLE I

DOD/EPA HAZARDOUS WASTE COOPERATIVE EFFORTS

SUBJECT SUB-AREAS (PROJECT NUMBER)	PROJECT *COOPERATIVE EFFORT IN PROGRESS
IN-SITU TREATMENT	
– DETOXIFICATION (1, 2, 3, 5, 6) (CHEMICAL & BIOLOGICAL)	(1) TCE MICROBIAL DEGRADATION -- ANNISTON SHARPE, LETTERKENNY AAP (2) #2 FUEL OIL MICROBIAL DEGRADATION -- SCOTLAND * (3) TCE BIODEGRADATION ON MOFFETT NAS * (4) MICROBIAL DEGRADATION – KELLY AFB * (5) RF THERMAL DECONTAMINATION * (6) TCE AEROBIC DEGRADATION * (7) SOIL WASHING – VOLK FIELD * (8) APHRONS FOR SUBSURFACE DECONTAMINATION
– EXTRACTION (7, 8)	
ON-SITE CLEANUP	
– THERMAL (1) – CHEMICAL (2) – BIOLOGICAL – SOLID REDUCTION	* (1) CATALYTIC DESTRUCTION (2) EXPLOSIVE REMOVAL: MOBILE CARBON REGENERATOR – RADFORD, LOUISIANA & IOWA ARMY AMMUNITION PLANTS
CONTAINMENT	
– BARRIERS (1)	(1) BENTONITE CLAY BARRIER – ROCKY MOUNTAIN ARSENAL
– STORAGE (2)	(2) LAGOON CLOSURE GUIDELINES – CORNHUSKER AAP

104

BLANK PAGE

BLANK PAGE

BLANK PAGE

TABLE I (continued)

DOD/EPA HAZARDOUS WASTE COOPERATIVE EFFORTS

SUBJECT SUB AREAS (PROJECT NUMBER)	PROJECT *COOPERATIVE EFFORT IN PROGRESS
SITE ASSESSMENT (ALL MEDIA)	
– SAMPLING & ANALYSIS (2, 3, 4)	* (1) UNCERTAINTIES IN RISK ASSESSMENT
– MONITORING STRATEGIES (6)	* (2) GEOPHYSICS INVESTIGATIONS – HOLLOMAN AFB, ROBINS AFB, PHELPS-COLLINS ANG BASE
– RISK ASSESSMENT (1)	* (3) SHALE OIL FATE
– MODELING (3)	(4) ORGANO-TIN ANALYSIS
– REMOTE SENSING (7)	(5) DATA MANAGEMENT AND MAPPING – EDGEWOOD AREA, ABERDEEN ORO LAB
– SUBSURFACE TRANSPORT (8)	(6) USE OF BIOASSAY DATA FOR CLEANUP STRATEGIES – ABERDEEN, FT. LEWIS
– DATA MANAGEMENT (5)	(7) AERIAL PHOTOGRAPHY TRANSPORT
	* (8) HYDROPHOBIC COMPOUND
	* (9) HEALTH IMPACTS OF MIXTURES
	* (10) TOXICOLOGY GUIDE
HIGH HAZARD WASTES (ALL TECHNIQUES)	
– DIOXIN (1,2)	* (1) IN SITU DETOX – APEG REAGENT
– FURANS	* (2) HERBICIDE ORANGE INCINERATION – JOHNSTON ATOLL
– PCB (3, 4)	(3) PCB MICROBIAL DECONTAMINATION
	(4) PCB ELECTROCHEMICAL DECONTAMINATION
ALTERNATIVE TECHNOLOGY (TO LAND DISPOSAL – RCRA FOCUS)	
– THERMAL DESTRUCTION (2)	(1) EVALUATION OF DEMONSTRATED TECHNOLOGIES
– CHEMICAL (3)	(2) INCINERATION (CRF TEST BURNS)
– BIOLOGICAL	(3) HEAVY METAL EXTRACTION – LETTERKENNY, TWIN CITIES, & ANNISTON AAP
– RECYCLE & REUSE (1)	
LEAKING UNDERGROUND STORAGE TANKS	
– MONITORING (2)	(1) UNDERGROUND LEAK DETECTION METHODS
– LEAK DETECTION (1)	(2) TANK FAILURE MODEL PREDICTION FT. BELVOIR, FT. CARSON
– CLEANUP	

105

105

PRIMER

FOR

DOD

INSTALLATION RESTORATION PROGRAM

JULY 9, 1985

BEST COPY AVAILABLE

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM

In Fiscal Year 1984 Congress created a separate appropriation entitled The Defense Environmental Restoration Account under the Defense Appropriations Act. Specifically, in addition to providing funds for currently-owned hazardous waste sites, Congress provided authority for the Department to spend money on lands not currently under DoD custody or on which DoD had conducted operations at some time in the past and caused a problem requiring cleanup. This funding level allowed us to accelerate our work and also to add a research and study component to the program. In Fiscal Year 1985, $314 million was appropriated and additional language was added to provide programming flexibility by allowing us to spend the money during the fiscal year on our most important projects without being bound by expenditure rate requirements. The amount requested for FY 1986 is $329 million. Figures 1 and 2 show how we spent the appropriation in FY 1984 and our program for FY 1985 respectively. Figure 3 shows our planned distribution of the $329 million of Operation and Maintenance funds we have requested for FY 1986.

A. Installation Restoration

The first of the four elements of the Defense Environmental Restoration Program is the Installation Restoration Program. This element is designed to identify and clean up hazardous waste disposal sites on both active installations and formerly used lands. This program responds to the requirements of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), commonly known as "Superfund." Federal

agencies are not eligible routinely to receive remedial funding under this Act for response actions, but must comply with the cleanup requirements described in the Act. DoD has been funding cleanups from our operations and maintenance or procurement appropriations. In Fiscal Year 1983, $23 million was spent on investigations, engineering studies, and cleanups or other remedial actions. In Fiscal Year 1984, under the augmented Environmental Restoration appropriation, $74 million was dedicated to cleanups and it is intended that $199 million will be spent for these efforts in FY 1985.

The Cornhusker Army Ammunition Plant in Nebraska shows how the restoration program operates. The Army completed a comprehensive records search and groundwater monitoring at the Plant. Small concentrations of waste chemicals were discovered in drinking water wells in a suburb of nearby Grand Island, Nebraska. The Army notified federal, state and local health authorities, and offered bottled water supplies to about 85 families. All this was accomplished within a few weeks after identification of the contamination problem. Within a few months, the Army had arranged for an extension of the local water supply and provided $5 million to the city to extend municipal water service to the affected residents. This is a good example of how the restoration account enables DoD to move quickly to relieve the affected public of the effects of contamination even before the cleanup action begins.

DoD is working closely with EPA to ensure the Installation Restoration Program is consistent with their approach in

Superfund. Last year, together with the states and EPA regions, DoD nominated 60 DoD sites which it was felt might score high enough for inclusion on the National Priorities List (NPL). Only half (33) of these were proposed for the NPL. EPA has recently evaluated another 10 bases for possible inclusion on the NPL and determined that 6 should be proposed for inclusion. Putting DoD sites on the list does not make us eligible for Superfund monies, but it will place the sites in national perspective. We project that on the basis of what is now known, about 50 of approximately 1,800 sites which meet NPL criteria will be DoD sites, less than three percent of the NPL. Additional sites on DoD installations may eventually require some form of remedial action, although at a much reduced scope from NPL sites.

The Installation Restoration Program is a four-phased approach designed to identify and clean up hazardous waste dump sites and halt migration of pollutants. Phase I is an initial assessment to identify all potential sites. It includes a detailed records search and interviews with current and retired employees, and anyone else who may have information. In 1980, Defense Guidance established a goal to complete the assessments identified at that time by the end of Fiscal Year 1985. Not only will this goal be met but, DoD is now over 75% of the way toward completing <u>all</u> known assessment requirements. At the conclusion of Phase I, the information gathered is evaluated and the sites are prioritized for further investigation. The worst sites would be the first for more detailed study. A report of these findings

and recommendations is published. No sites are eliminated, even if they don't score high enough for NPL listing. If a site presents a potential for contamination to people or the environment, it is considered in the next phase. Phase II is a physical survey at potential problem sites. It typically includes placement of monitoring wells, sampling and chemical analysis, and other field work. The purpose of Phase II is to define the nature of the pollutants and the scope and extent of the contamination. It is called the "confirmation phase." DoD has started about 180 Phase IIs and completed 51. When Phase II is finished at an installation, the findings are published. DoD has also decided that it is appropriate to rescore the sites after Phase II to ensure that cleanups are directed to the most important sites.

Both Phase I and Phase II reports are made available for review by EPA and State environmental agencies. The Phase II work may conclude there is no need for remedial action, or that some remedial action is required. This decision is made with EPA and State input. Phase III, technology development, is an optional step. It comes into play if cleanup technology doesn't exist or if new standards need to be developed. Phase IV is the actual remedial measures; it includes project design, construction, and execution. The goal in DoD is to have all construction required for cleanups underway by 1993. This is ambitious, since some complex problems don't present obvious solutions.

BEST COPY AVAILABLE

Installation Restoration Program Cost

In early 1984 the services were asked to estimate their costs for hazardous waste dump site cleanup (the "Installation Restoration Program"). With little or no experience, few studies in progress, and no EPA or industrial data to draw on, the estimates added up to $1.5 billion.

In December 1984, EPA issued a blockbuster-sized report required by CERCLA on a number of subjects, including cost experience and/or estimates for site study and cleanup. In the meantime, DoD's own level of understanding has increased dramatically. Using the EPA cost data and in-house information on the number of sites, plus projects that will result from studies in progress, the estimate is now $5-10 billion. Note that Rocky Mountain Arsenal is included separately in that figure because of its great cost.

The uncertainty in this figure is because there are still about 271 Phase II studies in progress or to be started. Costs can only rise and likewise the number of sites.

The next logical question is "how does this compare with the Superfund program?"

The real answer is that DoD's estimate used EPA's technical cost experience data per site, but the population of sites and fiscal responsibility are so different that no good comparison can be made. To amplify:

"population of sites" - Superfund only applies to those on the NPL; DoD has only 39 sites proposed for the NPL, but we've

BEST COPY AVAILABLE

got to clean up all our sites, NPL or not. So the population will include many small sites as well as big ones.

"fiscal responsibility" - Superfund pays largely for "orphan sites" and even there pays a maximum of 90% (States pay the rest). Further, EPA estimates 40% of the NPL will be paid for by private owners (i.e, are not orphans). DoD has to pay the total cost for all its sites.

B. Building Demolition and Debris Removal

The second element of the Environmental Restoration Program is almost entirely new, and was added by Congress in the 1984 Defense Appropriations Act. It includes removal of unsafe, unsightly, and dangerous buildings and structures, and other debris from active installations, inactive installations, and lands which were formerly used by DoD. While there have been efforts for over five years to clean up a few selected inactive sites, there was no comprehensive plan to identify and eliminate problems. This was partly because of lack of authority to spend money on lands which we do not control.

The appropriation is helping to clean up a wide variety of former sites. An example is the quick action taken by the Air Force in cooperation with EPA to respond to groundwater contamination apparently caused by past Air Force activities at the former Olmsted Air Force Base, Pennsylvania. The Air Force is using the appropriation to fund monitoring studies and a permanent alternate water supply to 12 families whose wells have been affected.

BEST COPY AVAILABLE

The Army has been assigned to manage the formerly-used sites program because of their recognized expertise and ability to manage complex projects, and their presence in virtually every state. The execution of this program is carried out through the US Army Corps of Engineers.

In order to deal with formerly-used sites comprehensively, nominations of candidate sites were solicited from each state governor through the National Governors' Association, from EPA, and other federal agencies. The Department of the Interior (DoI) has been especially helpful. Over 120 DoI sites are now being studied by the Army Corps of Engineers. In Fiscal Year 1984, the first year of this program, assessments at 41 sites began and will be increased by 200 more in 1985. A potential universe of 2,000 sites exists.

Of particular interest under the building demolition and debris removal program are the many training sites, including artillery and bombing ranges that were created during World War II and which may require some action to protect the public safety. These facilities were created whenever and wherever there was a need and today you can find an old pilot training base still standing, more or less, in the middle of a national forest. Similarly, millions of acres of public property were used as necessary for various types of ordnance ranges. These are especially troublesome because of the very limited technology available for large area cleanup of unexploded ordnance. Therefore, under this program an intensive development program to advance the state of the art of both the detection and the

BEST COPY AVAILABLE

recovery technology necessary to clean up such property is being funded.

C. Hazardous Waste Disposal

The third element of the program is hazardous waste disposal. Its purpose is the environmentally safe transportation, storage, treatment, and disposal of hazardous wastes which are currently being generated by DoD activities. This is accomplished primarily by contract with private industry to pick up and haul hazardous waste to approved disposal facilities. A very high priority here is to be sure that the contractors live up to the requirements of the contracts. Accidental or improper contamination of the environment with these hazardous wastes could cost millions of dollars to clean up. For instance, at Fort Lewis a few hundred gallons of PCBs dumped by an unknown person resulted in the contamination of 1,850 tons of soil. It took eight days to clean up the mess and it cost nearly half a million dollars. DoD therefore takes extraordinary efforts to see that its own contractors do the right thing. These efforts include cradle-to-grave manifesting of the cargo and rigid accounting for every pound of material and actual surveillance of the performance of contractors in their work. In about 15% of these transportation activities, contractors are actually followed by other contract employees to be sure that the waste is being delivered to an approved facility in a safe manner. Prior to having surveillance contractors in place, EPA's National Enforcement Investigation Center in Denver, Colorado, had provided assistance by performing this function and training DoD

BEST COPY AVAILABLE

employees to do so as well. The Defense Criminal Investigative Service (the investigative arm of the DoD Inspector General) has made deterrence of improper hazardous waste disposal a high priority enforcement item. For example, in April 1984, a DLA hazardous waste contractor was indicted by a federal grand jury for making false claims to the government in connection with a hazardous waste disposal contract.

The Defense Environmental Restoration appropriation in Fiscal Year 1984 included $32.2 million for hazardous waste disposal and another $35.6 million is programmed for fiscal year 1985. Most of this goes directly to DLA for disposal of waste generated by the military services. However, in the past two years the requirement to dispose of millions of pounds of American-manufactured PCBs, including American-manufactured PCBs from overseas installations, has been added to the normal disposal burden. This cost $10 million in 1984 and is estimated to cost $8 million in 1985.

D. Other Hazardous Waste Operations

The fourth and final element encompasses a number of initiatives to improve long-range program management and reduce the probability that cleanup at sites will be required in the future as a result of today's activities. It is the smallest element, accounting for less than one percent of the appropriation in Fiscal Year 1985, but the potential pay-off is huge. DoD is actively pursuing ways to reduce the amount of hazardous wastes that are generated on military bases. This work can easily pay for itself many times over. DoD will save money

BEST COPY AVAILABLE

by avoiding a disposal bill and by re-using materials such as solvents. Total solvent recycling by 1986 is currently planned which will reduce the total DoD waste stream by about one-fourth. The biggest pay-off will be in minimizing future potential liability associated with hazardous waste handling and, inevitably, mishandling. If it isn't generated, it won't be mishandled, disposed of or require cleanup years from now.

DoD is funding research and development to find safer, cheaper, and more effective ways to clear lands of unexploded ordnance. The Department of the Interior has already identified over 4 million acres of their land which may be contaminated with unexploded DoD ordnance. DoD has almost as much ordnance-contaminated land on their rolls and could sell some of it if we could decontaminate it cost-effectively. Better technology needs to be developed, and with the Environmental Restoration Program, this work has begun. This last point is important because DoD is sharing technology for remote detection of buried materials with EPA. While DoD is primarily interested in finding buried shells and bombs, EPA needs to develop better techniques for locating buried drums.

The Defense Environmental Leadership Project was established in January 1984 to develop innovative solutions to long-term environmental problems. Simply stated, the purpose of the Project is to improve DoD's national leadership position in environmental protection - to improve compliance and reduce wastes. The project team has taken on some tough issues - problems like hazardous waste management, groundwater protection,

BEST COPY AVAILABLE

risk assessment, used-oil management, and environmental audits. The Leadership Project has taken some important first steps in 1984: improvements have been made in hazardous waste management and conforming storage programs; a Used Solvent Elimination Program has been established and is being implemented by the military services; and policy guidance was developed for several critical environmental issues such as groundwater protection, leaking underground storage tanks and environmental audits. The Leadership project served as a focal point for negotiations in a compliance agreement with the EPA for eliminating the backlog of PCBs for disposal. DoD disposed of more than 8 million pounds of PCBs in 1984 at a cost of about $10 million. In 1985, many tasks started in the past year will bear fruit and several new initiatives will continue to improve DoD's national leadership position in environmental protection. High priority efforts include: development of an incentives program for pollution abatement waste reduction projects providing venture capital for fast payback projects with return on investment to installation operating funds; a demonstration project which will be set up for successful modifications to industrial processes for hazardous waste reduction; development of an installation level decision making guide for used-oil recycling programs; and environmental auditing programs which will be implemented by the military services. Additional payoffs are expected in terms of DoD's overall level of compliance and in hazardous waste reduction from the work going on in the leadership project.

DEPARTMENT OF DEFENSE-ENVIRONMENTAL PROTECTION AGENCY RELATIONS

During the past two years the communications between DoD and EPA have improved greatly. DoD has assigned a liaison officer to EPA for ten years and is currently negotiating for the assignment of an EPA employee to the DoD staff.

A Memorandum of Understanding with EPA on CERCLA which has established the administrative and jurisdictional framework for remedial actions on or near Federal facilities was signed in 1983. This memorandum has allowed DoD to get on with the job of cleaning up our sites while simultaneously maintaining an appropriate cooperative and responsive relationship with EPA. DoD has already started discussions with EPA to revise and renew this memorandum immediately upon passage of Superfund reauthorization.

DoD regularly provides EPA and interested parties a base-by-base status report on our Installation Restoration program. The technical details of our remedial action plans are shared with EPA. DoD is committed to doing the cleanup job right, and EPA participation is helping to fulfill that commitment.

Through the A-106 process, EPA annually reviews DoD budgeting for environmental work and advises the Office of Management and Budget of its adequacy.

In sum, DoD and EPA are cooperating to speed national environmental cleanup.

Mr. STENHOLM. Mr. Dunbar.

TESTIMONY OF GARY A. DUNBAR, SENIOR VICE PRESIDENT, CAMP DRESSER & McKEE, INC.

Mr. DUNBAR. Thank you, Chairman Stenholm, Mr. Smith. I appreciate the opportunity of being here today. I, too, will attempt brevity, and I have submitted written testimony and appreciate that being entered into the record.

Mr. STENHOLM. Without objection, it will be made part of the record.

Mr. DUNBAR. A couple of introductory comments: I am Gary Dunbar, and I am in charge, for our company Camp Dresser & McKee, Inc., of a large nationwide contract to perform remedial response activities at uncontrolled hazardous waste sites. Within that contract we are currently utilizing the services of over 39 small businesses as subcontractors. So, on that side of it, I think the contract represents some good news for the small business community. They are involved in the program.

I would like to zero in on four areas that I would hope that somehow your extension of the Superfund bill would address. In bringing these up, I want to be sure you understand that I endorse the concept of the bill and I strongly hope that it goes forward into the law and becomes part of the practice.

I would like to see the innovation enhanced, the opportunities for innovation technologies be enhanced. Our company has the same problems that have been testified to previously. We have developed technology. We have demonstrated the technology at our cost, and we share some of the same problems that have already been enumerated here.

But, in reading through the proposed testimony, I am speaking to you from the trenches of trying to get things to happen from the viewpoint of an engineering firm which evaluates technology, and then has the task of drawing up plans and specifications that are bid in the public arena for the application of the selected technology to a particular site.

The four problems that I hope that your bill will address: First is liability; second is the relationship of innovative technology to cost recovery; third is public bidding; and fourth is public participation.

On the issue of liability, over the last 18 months my firm and the firms that I compete with, my peers in our particular profession, have experienced a withdrawal of the insurance industry from the protection that they once offered to our professional practice. That simply does not exist. There is no insurance available.

That insurance, in the past, was obtained to provide insurance for our acts that may be deemed negligent in some future case. The absence of this insurance, the absence of the ability to insure against negligence, and attempting to practice in a field where the technology and the conditions are rapidly developing—and indeed the very definitions of negligence are changing almost daily—is a very, very difficult situation.

The problem, I would suggest, is so great that it does not just inhibit innovation; it is going to prohibit the application of conventional technologies. The other firms that have testified today that

offer specific technologies have before them the potential assumption of liability for any future problems that come forward at this site, not only under CERCLA, as joint and several liability, but also under State tort law.

We have that similar type of liability exposure, and my earnest plea is in the formulation of reauthorization of the Superfund if there be some measure taken that allows the cleanup work to go forward without the full burden of this liability falling on those who are attempting to clean up the site. It is a complicated problem, and that is not the main thrust of your meeting today, but it is a very big, inhibiting, and blocking factor in achieving the goals that you set forth.

Second, on cost recovery, as I understand the CERCLA legislation, the funds that are extended at a particular site are entered into a formula by the Government's attempts to regain that cost from those held responsible for that contamination. As I read the bill, I was unable to understand how any cost expended under this bill would relate to those costs that are attempted to be recovered through cost-recovery actions.

Perhaps that is my misreading or my lack of understanding of the full intent of the bill, but I myself would look for a clear separation of demonstration and innovation costs that are incurred from the cost-recovery formula; otherwise, I am fearful of an endless negotiation going on between those held responsible over the particular type of technology to be used.

The third point was alluded to earlier in at least two previous testimonies, and it relates to public bidding. Under the current rules for pulling together an engineering contract that will be bid on the street, for the contractors to come forward and apply their technology or their skills at a site, they are obligated to an identical technology where there will be three or four or more competitive bidders. Now, that can be waived when we can demonstrate that a proprietary product has advantages to it that cannot be found in any other way.

In actual practice, the specification of a proprietary product exposes the engineer to a litigation or a court case or an arbitration. My own experiences with those have been rather disheartening. I have specified proprietary products in the past. They had been taken to arbitration hearings. And despite what I consider to be preposterous claims by the party protesting, the decisions have been found against me.

So, I think some method or some language is needed beyond what is in the bill now. The bill now states the proprietary or patented products shall not be a reason for not considering application of technology, and indeed they shall be looked at.

There are regulations that were designed on public bidding, designed to get a fair and competitive price in the marketplace which is good, that do inhibit a sole proprietor of single technology from finding a market for his products. And if we want innovation, we have to find a way to get innovation and, at the same time, protect the public coffers by getting fair and competitive prices.

Finally, on our conventional approaches to Superfund sites and public participation, public hearings are required. I did not find in the bill anything addressing how the public had a say in using a

site for demonstration. I have been to a number of public hearings on Superfund sites and on non-Superfund sites that have hazardous waste. Those public meetings or public hearings are among the most exciting one can ever attend—the expressions that come from the public, the statements that come from the public are very heartfelt.

I have talked to people who have children dying in the neighborhoods. I have talked to people who don't know if they can let their children drink the waters. These aren't questions of property values, not questions of legal estate, not a question of diminished financial resources. They are people that talk about life and death on a very personal basis.

When we go to them, go into their community and we attempt to clean up the site, we bring the efforts of our technology to it, and they feel they have a right to have a say in what is going on. And indeed, all of the procedures that we have followed to date give them that right. If we are going to demonstrate or we are going to try a technology on a site in their neighborhood, I would think that they should have knowledge of that and be informed of it and have some say in it.

Those are the four areas that from my perception I would like to see the bill address to enable it to effectively achieve the goals that it sets out for. There may be other ways around these particular four issues that I have raised, but I have voiced them from the standpoint of where I see them from the trenches of trying to make things happen and get things done.

Finally, two comments. The bill as now written focuses on clean-up technologies. There are two major problems, and we have heard one of them addressed quite well today by the various concerns. But the two problems are ground water and sheer bulk material, contaminated bulk material—200,000 cubic yards of soil is a bulk material problem.

The technologies that we look for should focus on those two areas, bulk materials and ground water. Those are the kind of things that constitute the hazards. They are totally different types of problems, from a technical standpoint.

On ground water, we need additional technology to help us define the plume, its lateral and vertical extent underground. We need very accurate determinations of where the plumes are, very accurate determinations of how to remove the plume from the ground.

We talk about ground water. We talk about 5, 10, even 30 years to clean it up. Better knowledge of what is underground, better means of measuring that, better means of determining how it will behave are needed. We have very good devices available to us at this time, but they need to be better. And it will have a major impact on the cost of ground water recovery if we can improve our methodologies.

On bulk materials, I think you have heard sufficient testimony today. I don't need to go into it further. But we need devices and methodologies brought into the marketplace which will handle 200,000 cubic yards of material in a reasonable period of time without increasing the environmental hazard that already exists.

With that, I will conclude my testimony. Again, I want to emphasize that I would like to see this bill and its concept go forward, and go forward in a way that is truly effective and achieves its results, its goals.

Thank you.

[Mr. Dunbar's prepared statement follows:]

PREPARED STATEMENT OF GARY A. DUNBAR, SENIOR VICE PRESIDENT, CAMP DRESSER & MCKEE, INC.

Chairman Stenholm and members of the Committee on Small Business and the Subcommittee on Energy, Environment and Safety, I value your invitation and the opportunity to be here today to discuss the need to demonstrate and implement innovative and alternative technologies for Superfund site cleanups.

I am Gary A. Dunbar, Senior Vice President of Camp Dresser & McKee Inc. and Program Manager for a nationwide contract to perform remedial response activities at uncontrolled hazardous waste sites. I have more than 20 years experience in the field of environmental engineering, from planning and site selection to design and construction monitoring. My responsibilities as CDM Senior Vice President place me in responsible charge of the execution and quality control of hazardous waste projects nationwide.

BACKGROUND INFORMATION

For more than 40 years, Camp Dresser & McKee Inc. (CDM) has provided environmental engineering and management services to a variety of both public and private clients. In 1984, CDM was awarded a four-year remedial action contract to provide national hazardous waste management services, including: remedial investigations, feasibility studies, risk assessments, evaluations of waste management technologies, and planning

and design of remedial actions. To date, CDH is responsible for remedial activities at more than 160 sites.

INTRODUCTION

The complete range and scope of issues associated with technological solutions to hazardous waste cleanup problems are impossible to cover here today. The sheer complexity of the problem and the importance of making rapid progress toward new and more effective remedial technologies warrant strong federal, public and private support for research and demonstration of innovative technologies. To be effective in meeting an immediate need for ongoing site cleanups, a system must be developed to accelerate ongoing research, development, and demonstration efforts and to encourage experimentation. In the case of Superfund wastes, there is already a backlog of demand for solutions to hazardous waste removal, containment, and treatment problems. For the purpose of this testimony, I have chosen to focus on three major areas of concern: (1) professional liability, (2) groundwater contamination, and (3) hazardous bulk materials. The liability issues affect all contractors and parties involved in hazardous waste remedial actions. Groundwater contamination and hazardous bulk materials constitute the vast majority of contamination problems and health hazards at current NPL sites and are thus prime targets for innovative technology applications. Two other issues must be clearly resolved for this bill to achieve its goals: (1) financial complications of a demonstration project under cost recovery terms and (2) implementation of a demonstration project in compliance with public bidding procedures.

LIABILITY

The entire technical area now involved in hazardous waste is in jeopardy because of the unavailability of insurance coverage for hazardous waste remedial activities. Those persons now developing and implementing technical solutions for remediation of uncontrolled hazardous waste sites bear a tremendous liability burden without insurance coverage. These people and their firms or institutions have no protection from

BEST COPY AVAILABLE

liability as a federal employee does, no insurance (there is none available), no comprehensive indemnification (as contractors in certain defense or nuclear technologies do), and in a scenario of rapidly developing hazardous waste technolgies, no clear standard of practice by which negligence can be determined.

These persons are not only subject to liability under CERCLA but also under Tort law, whereby third party claims within state jurisdictions are exercised. This liability exposure has no limits either in amount of funds or time after the causal incident.

This evolving liability crisis does not just inhibit innovation—it stops it. Without the security of liability protection, remedial action contractors and others will not be able to continue in the field.

GROUNDWATER CONTAMINATION

Groundwater contamination has been documented at over 70 percent of the current and proposed National Priorities List sites as of October 1984. This problem is significant because of its extent and becomes alarming when the widespread use of groundwater as drinking water supplies is considered. Development and implementation of strategies for groundwater protection is one of EPA's top priorities and is one of the primary health concerns under CERCLA. Another key factor in groundwater cleanups is the length of time required for remediation. Cleanups may require from 5 to 30 years to be effective, depending on the extent and type of contamination. Specific research and development areas related to groundwater contamination include the following:

- The ability to accurately determine the lateral and vertical extent of the contamination

- Non-homogeneous medium which can affect groundwater flow, chemical/physical changes, and extraction

AU7-5/3

- Improved methods for extracting and treating contaminated groundwater

- Development of a consistent method to determine when and under what conditions the groundwater is considered clean (when further extraction is unnecessary).

Water is at the forefront of the environmental issues of our time. The availability of clean water has already become a limiting factor for industrial and residential growth in many areas of the country. Protection of our groundwater resources clearly ranks very high as a national priority. Intensive efforts in research and demonstration of innovative technologies, along with rapid progress toward implementation of these new technologies, will provide long-term benefits to the country and may be absolutely critical to protect an irreplaceable resource.

BULK MATERIALS

The majority of uncontrolled hazardous waste sites in the country include bulk materials in some form. These sites include landfills, drums, piles, and other forms of bulk waste. In some cases, particularly landfills, the volume of contaminated material may be quite large. There are two primary categories of appropriate remedial technologies for these sites: (1) stabilization/containment and (2) physical/chemical alteration (treatment).

Containment technologies have come under fire because of a questionable history of effectiveness, and are often accused of causing many of the contamination problems we face today. This is not, however, cause for eliminating containment from consideration as a remediation technique. Containment, when coupled with waste stabilization, may be the best solution for many sites, particularly those at which large volumes of contaminated material preclude environmentally acceptable or cost-effective treatment or destruction. What <u>is</u> needed is a concentrated research, development, and demonstration effort to provide

acceptable stabilization and containment technologies that will prove cost effective and reliable over the long term.

Treatment techniques are gaining wider acceptance as the industry moves away from the traditional landfilling of all solid wastes. However, treatment technologies face challenges in public resistance to local siting of facilities and regulatory requirements to meet discharge standards. This public concern and resistance is probably most dramatically seen in the implementation of incineration technologies. Goals for innovative incineration technologies are:

- o More complete destruction of toxics
- o Minimized residuals
- o Capture of lighter toxic compunds
- o Concentration of hazardous compounds in residue
- o Odor and plume control
- o Plume modeling
- o Cogeneration schemes for more efficient energy use

The goal of a CERCLA-based research and development program must include methods for streamlined movement from testing into implementation stages. Some examples of the types of emerging thermal destruction technologies which could be candidates for accelerated implementation programs include the following:

- o High Temperature Electric Reactor
  - — Vertical reactor with electrodes in walls
  - — Pyrolizes organic wastes at 3800-4400°F
  - — Application primarily for contaminated soils
- o Molten Salt
  - — Molten sodium carbonate at 900°C
  - — Organics destroyed heat; by-products react with sodium carbonate

— Application primarily for highly toxic and halogenated waste streams

o Plasma Arc

— Electrically generated plasmas
— Waste destruction at temperatures up to 50,000°F
— Prototypes transportable
— Designed for highly toxic liquid waste streams

o Molten Glass Incineration

— Electric furnace with a pool of molten glass
— Furnace used in glass manufacturing industry
— Temperature of molten glass maintained above 2300°F
— Combustibles are oxidized
— Inorganics and ash encapsulated into glass pool
— Suitable for any combustible waste

Innovative technologies for bulk materials are not limited to incineration. Other types of treatment technologies currently in use or under development include the following:

o Chemical precipitation
o Fixation/encapsulation
o Chemical/biological detoxification
o Aeration

The processes which result in hazardous waste end products must also be carefully evaluated with the objective of reducing waste at its source.

CONCLUSION

In summary, the Congress has established a comprehensive program with the CERCLA of 1980. The addition of an amendment for the testing and

BEST COPY AVAILABLE

demonstration of innovative technologies to be used for carrying out response actions under this Act will enhance the goal of the Act.

However, for this amendment to be truly effective it should address and resolve:

1. Liability issues,
2. Cost recovery issues,
3. Public bidding regulatory issues, and
4. The need for investigatory technologies as well as clean-up technologies

Within those facets properly addressed this extension of innovative technology to Superfund cleanups will make a good program better. THANK YOU.

Mr. STENHOLM. Thank you.

Mr. Smith.

Mr. SMITH. No questions.

Mr. STENHOLM. No specific questions at this point, but I would again thank you for your testimony. The written testimony will be studied. And I think it was a very fitting ending to the hearing for us to have probably our largest business entity involved in the actual waste disposal cleanup, the Defense Department, and then to have the anchorman, a Superfund contractor, who has been there working at actual sites.

And I appreciate your four points. We will tell you that at least two of them—the liability question and the issue of public participation—we see as being vital toward an effective program of demonstration.

The problems are there, and how we address them from the public's standpoint in my judgment will be a make or break situation. Far too often, in the question of the environment, we in the Congress and those who administer the policies have not been successful in bringing the general public we represent along with us. Every time we do that we fail the people, and I think that is one of the real challenges we face as we deal with a reauthorized Superfund.

With that, I thank you all sincerely for your testimony, and make the same request of you to work with us as we work with our little brick in this big foundation. I hope you can help us develop this initiative to the maximum degree possible in order that we might have a piece of legislation that we can incorporate into an improved Superfund package.

Are there any further comments?

I thank my colleague, Robert Smith, for being here today, and all of the staff of this subcommittee for the work they have done in putting this hearing together. I also want to extend my gratitude to all who have been helpful to us, and to those who may be sitting in on a committee hearing for the first time thanks to C-SPAN.

It has been a very educational process for this Member of Congress, as I hope it was for those tuning in. We will look forward to going ahead with an idea and, I hope, seeing it become a part of the law.

Thank you all for being here.

[Whereupon, at 5:15 p.m., the subcommittee adjourned, to reconvene subject to call of the Chair.]

APPENDIX A.—MATERIAL SUBMITTED BY J.M. HUBER CORP. FOR INSERTION IN THE RECORD

INSERT 1

J. M. Huber Corporation
P. O. Box 2831
Borger, Texas 79007

806/ 274-6337
Telex: 73-8458

August 29, 1985

Congressman Charles W. Stenholm
B-363 Rayburn House Office Building
Washington, D.C. 20515

Dear Congressman Stenholm:

Huber Technology Group of J. M. Huber Corporation is very pleased to provide you information concerning development and implementation barriers our Advanced Electric Reactor (AER) hazardous waste treatment technology has encountered. Attached is a summary of these obstructions which you may utilize as testimony for hearings and records of the Committee on Small Business Subcommittee on Energy, Environment, and Safety Issues Affecting Small Business.

Additionally, I have enclosed material which describes our technology and copies of reports detailing the major tests and demonstrations conducted with the AER. I have also attached a copy of page 7 from the August 19, 1985 issue of Hazardous Waste Report as well as a letter from Mr. Oscar Scott of Huber to Don Oberacker of EPA.

The enclosed magazine article further enforces the institutional barriers which emerging technologies face. Incinerators cannot readily meet the requirements for treating acutely hazardous waste. Therefore, EPA desires to relax the standards to accommodate an established technology with which they are familiar. In considering the recent environmentally detrimental occurrences with Rollins Environmental's Baton Rouge, Louisiana incinerator (described in various newspaper articles, including the Wall Street Journal), it is obvious that the standards should not be relaxed. The AER has proven that the standards cannot only be met, but achieved at inherently safer operating conditions.

As is evident from the enclosed reports, the AER is a demonstrated viable method of permanently detoxifying hazardous wastes. It is our conviction that the technology could be effectively utilized to transform many Superfund sites into safe, healthful environments with no future ramifications. To date however, it

remains otiose. As a result, Huber has been forced to sharply curtail our efforts to market a permanent treatment technology that is desperately needed. However, Huber, like any private firm with an emerging technology, cannot continue indefinitely with no return on substantial investment.

I regret that prior commitments preclude our being present to personally testify at the subcommittee hearings. However, I hope the information we have enclosed provides you with an insight of the problems emerging hazardous waste treatment technologies are encountering.

Sincerely,

Jimmy W. Boyd, P.E.
Manager Environmental Compliance

pjh

Attachments

INSERT 2

J. M. Huber Corporation
P. O. Box 2831
Borger, Texas 79008-2831

June 13, 1985

Mr. Don Oberacker
Hazardous Waste Engineering Research Laboratory
U.S. EPA
26 West St. Clair Street
Cincinnati, OH 45268

Dear Don:

This letter is just a follow-up on our conversation of June 10 in which you asked for clarification concerning Huber's intention to make available the Advanced Electric Reactor technology for use in cleanup of hazardous waste sites.

As I stated in our discussion, Huber has invested several years and millions of dollars in developing technologies and performing demonstrations related to the AER. It has all along, and continues to be, our desire to see the AER enter the hazardous waste treatment technology market and to be utilized either by ourselves or others for the cleanup of waste sites.

Don, I would be less than candid to not mention that we have been disappointed by the lack of response from the various agencies to what we feel has been the outstanding results of the AER in treating a variety of hazardous wastes. Huber has financed and thoroughly documented tests in which the AER destroyed generally to detection limits hexachlorobenzene, polychlorinated biphenyls, octochlorodioxin, tetrachlorodioxin, carbon tetrachloride, and at the present time is collaborating in a government-sponsored field demonstration on Agent Orange contaminated soil.

As a business venture, companies such as Huber can only afford to invest a limited amount of time and money in developing technologies unless there is some encouragement that these technologies will ultimately be accepted by the regulatory communities. When it becomes obvious that those communities have vested interests in other technologies such as appears to be the case with the EPA rotary kiln, hard decisions need to be made concerning the likelihood of ultimate success for an "emerging" technology. We feel the AER is far more than an emerging technology because of its demonstration status. As you know, we were the first technology to ever successfully field demonstrate destruction of dioxin on soil at Times Beach, Missouri.

At the present time, we continue to be sensitive to the marketplace to determine if the interest in the AER is substantive or only based on scientific curiosity. As I told you, Huber stands ready to make the technology available and at the present time is even considering licensing it to several major firms already in the hazardous waste treatment business. Perhaps they will be more adroit at negotiating the regulatory maze which has effectively created barriers entry for technologies such as the AER.

Again, thank you for your call and the opportunity to clarify the questions raised by Dr. Stephen. Given our concerted effort to educate the agency regarding our intentions for the AER, it is indeed disappointing to hear that Dr. Stephen is laboring under the misconceptions that the AER is "not going to be available" for hazardous waste site cleanups.

To reiterate, the AER technology is now, always has been, and so far as I know will continue to be available for cleanup of hazardous waste sites.

Regards,

Oscar T. Scott IV
General Manager

pv

bcc: Jack Clem/Jim Boyd
Bill Schofield/Darrell Derrington/EPA File
Jerry Waggoner
Henry Balikov

BEST COPY AVAILABLE

INSERT 3

DEVELOPMENT AND IMPLEMENTATION BARRIERS ENCOUNTERED BY HUBER TECHNOLOGY GROUP'S ADVANCED ELECTRIC REACTOR

Before discussing potential barriers to our technology's development and implementation, it is appropriate to define the manner in which J. M. Huber wishes to market the AER. Specifically, we will only offer on-site treatment, meaning we will transport the reactor to the waste site and treat the waste at its original location. The treated waste will be returned to its original location, and Huber will not assume long-term liability. These policies limit our market; however, this is a self-imposed limitation, not one resulting from government regulation.

We feel we have been as successful as anyone in developing, marketing and securing permits for our technology. We are not espousing that acceptance cannot be achieved, but it is far more costly and time consuming than it should be. Barriers that J. M. Huber Corporation has encountered in developing and marketing the Advanced Electric Reactor for use in decontaminating soil in the United States can be divided into four categories: uncertainty, government inconsistency, inhibited progress, and institutional.

I. Uncertainty

A. Prior to RCRA reauthorization, there was no provision for permitting research and development and demonstration facilities such as the one we have in Borger, Texas. Even with the new regulations, expeditious processing of an RD&D permit application is not guaranteed.

It has been difficult to obtain feedback from EPA concerning the treatment of our technology from a permitting standpoint, i.e., the legislation addresses only incinerator technologies and restricts us to monitoring which is only applicable for these units. Therefore, defining appropriate operating and permitting criteria has added a significant amount of time and cost to the permitting process. This is imperative, as trial burn costs easily exceed $100,000; therefore, we cannot afford to repeat trial burns.

B. Secondly, since no regulations exist covering thermal treatment devices, any permit which is issued under RCRA would be subject to change when regulations are formulated. This increases economic risk factors and represents another area of uncertainty for a developing technology.

C. To date it has been unclear what the regulations will be for dioxin contaminated soils. Before J. M. Huber can aggressively address the dioxin problem, we must know what regulations we will operate under. We are certain our technology can permanently treat dioxin, as we have conducted tests on our research facility and concluded a successful field demonstration in Times Beach, Missouri. The new RCRA regulations address the issue, but will the same standards actually be applicable under CERCLA?

D. The question of delisting is one that has a great deal of impact on treating a hazardous waste site. If the material coming out of our reactor cannot be delisted, either automatically or easily, then the impetus for permanent treatment is no better than landfilling. There also exists no current guidelines concerning how "clean is clean." We need to know what the minimum criteria is whenever we are treating PCB or dioxin-laden material. Regulations are needed which provide for automatic delisting of waste treated in a permitted facility. If a facility is certified to meet designed waste treatment criteria, why shouldn't the discharge be considered nonhazardous?

E. There is a general uncertainty about regulatory, legislative, political, and economic aspects of the hazardous waste industry. What is actually the nation's commitment to hazardous waste treatment and cleanup? It is going to be extremely expensive. Is the nation really going to spend the required money? As a result of the overall industry uncertainty, it is becoming extremely difficult for Huber to develop an effective marketing strategy to economically justify our new technology. Money expended to date for "permanent" clean up of Superfund sites has been near zero. This does not provide much impetus for new technology.

F. There is high uncertainty regarding risk and liability. Will the standard for responsible performance be the same tomorrow and ten years from now as it is today? Environment Impairment Liability insurance is presently virtually impossible to obtain. This issue must be satisfactorily addressed.

G. A clear national policy addressing these issues is needed. It must be one supported by the White House, EPA, and industry.

II. Government Inconsistency

A. We have spent considerable manpower and effort to determine who administers the law or has specific permitting authority and how interpretations vary among agencies in the hazardous waste industry, i.e., state agencies, Regional EPA agencies, or EPA headquarters. Lack of thermal regulations and established policies for nationwide permitting are major reasons why the appropriate permitting authority is often unclear.

Example I: Permit for Research Facility

In late 1983, Huber established the need for a RCRA permit for our Borger, Texas AER research and development facility. Talks were initiated with both EPA Region VI and the Texas Department of Water Resources (TDWR) to determine specific permit requirements and issuance authority. After several months of meetings, negotiations, and correspondence, these issues were seemingly resolved. In May, 1984, Huber submitted a Hazardous Industrial Solid Waste (RCRA part B) permit application to TDWR.

Within 6 weeks of the submittal, the application was deemed administratively complete. In early December, 1984, TDWR issued a draft permit for review. EPA's technical review comments stated that the permit would be a state permit only (not RCRA) since no regulations were currently promulgated for thermal treatment devices. This was the exact issue which we had previously spent several months resolving with EPA and TDWR legal departments. Obviously the information was not disseminated within EPA. It required additional attorney expenses and two more months before the issue was resolved as previously agreed upon.

Subsequently, the revised RCRA amendments became effective, thus bringing the RCRA permitting authority issue to the surface again. As a result the Texas Water Commission suspended issuance of any RCRA permits in Texas until this situation was resolved. It now appears a memorandum of understanding has been reached between Texas and EPA.

However, as can be noted, these inconsistencies have resulted in at least a 6 to 8 month delay in granting of our permit (which is still pending).

Example II: Nationwide TSCA Permit Application

Another example of inconsistency involves Huber's efforts to obtain a nationwide TSCA permit for destruction of PCBs. In May, 1984, Huber's AER was issued a Toxic Substances Control Act permit for destruction of PCB by EPA Region VI. We subsequently held discussions with EPA headquarters regarding requirements for a nationwide TSCA permit. After these talks, we were convinced that no major problems were involved (i.e., additional testing, trial burns).

Therefore, we expended approximately $30,000 preparing the application. Just before completion of the document, EPA determined that a change in analytical measurements should be required, meaning the results from our Region VI certification tests were not acceptable. EPA required analysis of the exit gases and reactor residue for isomers which were not originally in the feedstock nor likely to be formed during the treatment process.

Why should a process already permitted in Region VI for PCB destruction not be accepted on a national basis for the same purpose?

B. The current Superfund trends in the cleanup of NPL sites seem to put a lot of emphasis on the initial cost (i.e., landfilling or similar technology) of cleaning up a hazardous waste site, rather than looking at the ultimate life cycle cost. As an example, the wastes removed from Love Canal and placed at a Niagara Falls, New York, land disposal facility now appear to be leaking, resulting in possible water table contamination. Permanent treatment of these wastes could have saved money in the long run and avoided this unfortunate mishap (Environmental Reporter, Page 1149, November 2, 1984). Emerging technologies are being developed to provide permanent treatment. Until there is some impetus to utilize permanent treatment, marketing of these technologies will continue to lag. We began with the premise that "Superfund" money would begin to be utilized extensively. This has not come about. Therefore, we have been forced to reduce our marketing and development efforts. Permanent treatment must be utilized and encouraged.

C. EPA presently contends that permits are not required (by law) to clean up Superfund sites. The states do not have the same viewpoint. In fact EPA was required to obtain a RCRA permit for their work in Missouri with

the mobile incinerator. This demonstrates inconsistency and adds to uncertainty and cost (i.e., will a permit be required, if so cost of permitting alone could exceed $200,000).

This issue must be resolved. If permits will, in fact, be required 1.5 to 2 additional years will be required for cleanup of each site and millions of dollars more in extra expenses nationwide.

III. Inhibited Progress

A. Slow or inhibited progress in passing of proposed legislation and implementation of existing rules favors the status quo and impedes new technology. Until the recent RCRA reauthorization provided for the actual banning of most materials in landfills, incentives for new technologies which provide permanent treatment were very minimal. Even with implementation of the new rules it could be several years before significant changes occur.

Look at time schedules for banning of landfilling:

1/3 - 45 months
1/3 - 55 months
1/3 - 66 months
California list - 32 months
Dioxin & Solvents - 24 months - and then rules only

Even if these schedules are attained, 3 to 5 years of "waiting on the sideline" with no return on investment is more than most emerging technologies can endure.

B. Extremely long periods of time are required to secure a contract and actually initiate a commercial hazardous waste treatment project. The major incentive for the use of our technology in cleaning up waste sites is provided by Superfund. Based on the present guidelines, it will require approximately four to seven years before actual use of our technology in the marketplace can begin. This belief is based on the following anticipated series of events:

- First, it will take approximately one year of legislative delays to obtain reauthorization of CERCLA.

- Another one-year regulatory delay is expected to allow EPA to formulate and implement regulations for these new laws.

- It will then require approximately one to three years to go through procurement procedures to obtain a contract to cleanup a site.

- Finally, obtaining RCRA or TSCA permits typically require 12 to 18 months (even without public hearings), thus further increasing the time and money required before a company can begin to recoup their investment. Permitting needs to be streamlined.

The point is obvious: There are long delays in the process of procuring business on a Superfund site. Most emerging technologies cannot economically tolerate these delays.

C. EPA seems to have difficulty making and implementing policies because of the extensive bureaucratic reviews involved. This needs to be drastically overhauled.

IV. Institutional Barriers

A. Established institutions, technologies, or procedures are barriers to emerging technologies.

1. EPA knows landfilling and to a lesser extent incineration. Therefore, they are prejudiced towards using these methods of hazardous waste treatment.

2. They are not familiar with new technologies and are very hesitant to recommend utilization of any. This is evidenced by EPA's testing of its own incinerator in Missouri. They are going to perform this dioxin test even though Huber has already successfully performed a demonstration test in Times Beach, with its inherently safer and more efficient technology. This was done at a cost to Huber of approximately $1/2 million. Although we received tacit encouragement from EPA, there has been no assistance of any real substance.

B. Established waste treatment companies desire things to remain unchanged. Their efforts often inhibit new technologies.

C. The permitting process is centered around existing technologies. Therefore, no explicit provisions are made for R&D. Even though they can be obtained, extensive delays are involved in negotiating details.

V. Summary

Huber is an established, financially-sound for profit organization which is willing to (and has) invested its resources in new business ventures. However, we cannot continue in such ventures if the barriers cited above are not satisfactorily resolved. We have a variety of other potential uses for our technology which do not present these impediments and risks. We must be able to determine with confidence how large the market is or may be, when it will ultimately prevail, and a good quantification of the risks involved. These are questions which any company with emerging technology must answer, and until resolved, efforts will be severely restricted.

INSERT 4

NEWS

MISSOURI DEPARTMENT OF NATURAL RESOURCES
P.O. Box 176 Jefferson City, Missouri 65102 (314) 751-3443

Vol. XII
No. 177

writer: Nancy Guyton

(For immediate release)

JEFFERSON CITY, MO., December 6, 1984 - A new technology for destroying dioxin in soil has been proven effective at the state's Times Beach Research Facility. State officials reported today that they have received laboratory results confirming that the J. M. Huber Corporation reduced dioxin levels in soil to less than 1 part per billion with its electric reactor in tests conducted at the facility last month.

"To my knowledge, this is the first time dioxin has been removed from soil outside the laboratory and under field conditions," said Fred Lafser, Director of the Department of Natural Resources. While he considers the reactor's success a breakthrough, Lafser cautioned that the system probably won't be the answer for all of Missouri's dioxin problems.

"The reactor would have to be demonstrated cost effective and feasible at specific dioxin sites. If a decision were made to utilize this technology, a commercial-scale system would have to be constructed and permitted, which could take one to two years. State and federal health officials believe we must move forward with cleanup at some of our sites as soon as possible. However, we do feel the Huber system, and others like it, would be compatible with our plans to clean up the sites and store the material on-site."

Lafser said he expected the Huber electric reactor to become one of several technologies that will effectively destroy dioxin in soil. "Next month, EPA will begin a demonstration of its mobile rotary kiln incinerator at the Denney Farm dioxin site in southwest Missouri. We believe this unit is going to be equally successful."

Huber brought a small-scale, pilot reactor to Times Beach from the company's Borger, Texas, research and development laboratory the first week in November, and on November 13 conducted three tests with the unit. Soil containing dioxin levels above 100 ppb was used in each test. In analyses of the soil process in all three tests, no dioxin was detected at the one part per billion level, the level health officials consider safe.

Christopher S. Bond Governor
Fred A. Lafser Director
Ron Kucera Deputy Director

William Palmer
Public Affairs Director

56-465 O—86——6

The electric reactor relies on intense heat generated by electrical current to destroy dioxin molecules. (In an incinerator, dioxin molecules are destroyed by heat generated by combustion process that requires oxygen.) The reactor unit is a hollow cylinder containing a graphite tube through which the contaminated materials pass. Electrodes on the outside of the core heat the tube to extremely high temperatures, between 4000 and 5000°F. Because of the extremely high temperatures and because no oxygen is required in the process, no harmful emissions are generated, and the soil emerges as a non-hazardous, granular material.

State officials said that they weren't surprised by the success of the Huber reactor. At its Borger facility, Huber had demonstrated that the reactor could destroy a variety of hazardous materials, including polychlorinated biphenyls (PCBs) and a non-toxic type of dioxin considered more difficult to destroy than the dioxin that's a problem in Missouri.

State officials say that advantages of the reactor include its efficiency at destroying dioxin and its inherent safety since there are few emissions to manage. One disadvantage of the system, they believe, is that it can accept only fine materials and requires a sophisticated feed system; also, the capacity of even a commercial-scale reactor might not be great enough to handle the quantity of contaminated material at some of the state's larger sites.

The solution to Missouri's dioxin problem will very likely require more than one type of technology, said Natural Resources Director Lafser. "All of these technologies will have to be competitively priced and cost effective. One of the thermal destruction technologies such as the reactor or the incinerator may be the answer for one site while an 'in-situ' treatment process may be more appropriate at another."

Several studies of in-situ, or in-place, treatment methods are being conducted at the Times Beach research facility. With these technologies, the contaminated soil is detoxified where it is and conceivably would not have to be moved to another location for treatment. Underway at the research facility are a vapor phase transport study being conducted by the Monsanto Company; an enzyme-enhanced biodegradation study being conducted by Agro-K of Minneapolis; and a study using a sodium-based chemical destruction method developed by PPM Incorporated of Kansas City.

Another in-situ method, which is developed by Dr. Rengarajan Soundararajan and which involves treatment of the soil with hydrazine hydrate, will be tested at the Times Beach research facility this week.

Natural Resources officials said it will be at least a year before most of the in-situ studies produce conclusive results which can be compared with the results obtained with thermal destruction technologies such as the Huber reactor and the EPA incinerator.

INSERT 5

TIMES BEACH, MISSOURI

FIELD DEMONSTRATION OF THE DESTRUCTION OF DIOXIN IN CONTAMINATED SOIL

USING THE

J. M. HUBER CORPORATION ADVANCED ELECTRIC REACTOR

Analytical Results and Report by:

Roy F. Weston, Inc.
One Weston Way
West Chester, Pennsylvania 19380

and

York Research Consultants
938 Quail Street
Denver, Colorado 80215

Weston Project #2552-01-01

Weston Program Director: Kay H. Jones, Ph.D.

Weston Program Manager: Barry L. Jackson

Weston Analytical Team Manager: David Ben-Hur, Ph.D.

York Project Manager: Robert Collins

February 11, 1985

TABLE OF CONTENTS

Section and Title			Page
1.	EXECUTIVE SUMMARY		1-1
2.	INTRODUCTION		2-1
3.	PROCESS DESCRIPTION		3-1
4.	TEST PLAN AND PROJECT PERSONNEL		4-1
	4.1	Test Plan	4-1
	4.2	Industrial Hygiene Plan	4-1
	4.3	Project Personnel	4-1
5.	ON-SITE PERFORMANCE		5-1
	5.1	Operating Parameters	5-1
	5.2	Frequency of Sampling and Analysis	5-1
	5.3	Sampling and Analytical Procedures	5-1
		5.3.1 Process Stream Solids Sampling Procedures	5-1
		5.3.2 Process Stream Solids Analytical Procedures	5-2
		5.3.3 Gaseous Emissions Sampling Procedures	5-3
		5.3.4 Gaseous Emissions Analytical Procedures	5-4
	5.4	Industrial Hygiene Monitoring	5-6
6.	RESULTS AND CONCLUSIONS		6-1
	6.1	Process Stream Solids Analytical Results	6-1
	6.2	Gaseous Emissions Analytical Results	6-2
	6.3	Qualification of Results	6-3
	6.4	Conclusions	6-4
REFERENCES			R-1

BEST COPY AVAILABLE

LIST OF TABLES

Table No. and Title		Page
4-1	Sampling Methodology and Frequency of Sampling	4-2
4-2	Industrial Hygiene Sampling Plan	4-3
5-1	Process Operating Parameters	5-8
5-2	Performance: Frequency of Sampling and Analyses for Dioxin	5-9
5-3	Industrial Hygiene Monitoring: 2,3,7,8-TCDD Performance Results	5-10
6-1	Summary of 2,3,7,8-TCDD Datapoints	6-5
6-2	Dioxin Concentrations and Mass Rates, DE's, and DRE's	6-6
6-3	Products of Incomplete Pyrolysis	6-7
6-4	Stack Emissions: Fixed Gases, Moisture, Chlorine, Particulate Loading	6-8

LIST OF FIGURES

Figure No. and Title		Page
3-1	Vertical Cross-Section of Advanced Electric Reactor	3-2
3-2	Process Schematic with Sampling Locations Shown	3-3
4-1	Project Team Organizational Chart	4-4
4-2	Field Team Organizational Chart	4-5
5-1	Modified Method 5 Sampling Train	5-11
5-2	Sampling Procedures	5-12
5-3	Sample Recovery Procedures	5-13
5-4	Preparation Procedures	5-14

SECTION 1
EXECUTIVE SUMMARY

Roy F. Weston, Inc., was employed by J. M. Huber to provide independent analytical support for HUBER's dioxin destruction demonstration in Times Beach, Missouri.

Triplicate testing was conducted on November 13, 1984, at the Missouri Department of Natural Resources' (MDNR) Dioxin Research Facility in Times Beach, Missouri, using Huber's mobile 3" I.D. Advanced Electric Reactor (AER) under the supervision of MDNR.

Times Beach soil contaminated with approximately 80 parts per billion (ppb) of 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) and other chlorinated organics was fed through the mobile reactor. All streams exiting the AER process were carefully sampled/analyzed for 2,3,7,8-TCDD and products of incomplete pyrolysis (PIP's).

No 2,3,7,8-TCDD or PIP's were detected in the treated soil at detection limits of 0.11 ppb for the 2,3,7,8-TCDD and 10 ppb for the PIP's. Similarly, no 2,3,7,8-TCDD or PIP's were detected in the stack gas stream at detection limits of 0.55 ng/m³ on the 2,3,7,8-TCDD and 25 ng/m³ on the PIP's. The treated soil analyses for 2,3,7,8-TCDD and PIP's were independently verified by Environmental Research Group, Inc. (ERG), Ann Arbor, Michigan, and by Envirodyne Engineers, Inc. (EEI), St. Louis, Missouri, under the supervision of MDNR.

The on-site analyses provided by YORK/WESTON were possible with the REM-MS2 mobile GC/MS/MS system. In addition to sampling and analytical services, WESTON also provided industrial hygiene training, on-site monitoring, and certification of equipment detoxification following the demonstration.

MDNR and HUBER believe this to be the world's first successful field demonstration of a dioxin treatment technology. Subsequent to this demonstration, a dioxin burn by Ciba-Geigy in late November 1984 at Basal, Switzerland, and plans for a dioxin burn in January 1985 by the U.S. EPA using a rotary kiln incinerator in southwest Missouri were announced.

WESTON has been presented with HUBER test reports documenting a number of tests that have been conducted over the previous 14 months using the mobile 3" AER as well as a stationary 12" AER at HUBER's Borger, Texas, research facilities. For example, tests with a variety of thermally stable wastes and waste surrogates such as Arochlor 1260 polychlorinated biphenols (PCB's), carbon tetrachloride (CCl4), and octachlorodibenzo-p-dioxin (OCDD) (as reported by WESTON) have demonstrated destruction and removal efficiency (DRE) results on the order of 99.99999 percent (seven 9's) at feed rates up to 2500 pounds per hour. References 11-14 document previous test reports.

More detailed information describing how the Times Beach tests were conducted and the results analyzed is provided herein.

SECTION 2
INTRODUCTION

The Huber Technology Group of the J. M. Huber Corporation (HUBER) has developed a high-temperature pyrolysis process for the permanent detoxification of hazardous wastes. This process is built around the unique Advanced Electric Reactor (AER).

Two fully equipped research reactors are maintained in Borger, Texas. The smaller of the two units, AER3 (3" diameter reactor), has been mounted on a trailer for mobile demonstration and proof of concept of the AER process. A stationary commercial scale unit, AER12 (12" diameter reactor), is maintained in Borger as a research and development facility.

HUBER possesses a Clean Air Act permit from the State of Texas which authorizes testing of hazardous wastes in the Borger facility. The process is certified by EPA Region VI for the destruction of PCB's under the auspices of the Toxic Substances Control Act (TSCA, 40 CFR 761). HUBER has applied for and expects to be granted a Resource Conservation and Recovery Act (RCRA) permit from the Texas Department of Water Resources (TDWR) in the spring of 1985. This permit will allow testing of essentially all known non-nuclear wastes including all listed RCRA and CERCLA wastes. These permits were issued based on successful demonstration tests with PCB's and CCl_4.

Treatment of soil containing the extremely toxic 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) was demonstrated with the mobile AER3 unit on November 13, 1984, in Times Beach, Missouri. Prior to this field demonstration, both research reactors were tested on octachlorodibenzo-p-dioxin (OCDD), a much less toxic but highly refractory surrogate material chemically similar to 2,3,7,8-TCDD.

HUBER retained Roy F. Weston, Inc. (WESTON) of West Chester, Pennsylvania, and their subcontractor, York Research Consultants (YORK) of Denver, Colorado, to provide independent third party technical support for sampling, analysis, industrial hygiene, and documentation. WESTON has extensive experience working with dioxin-contaminated soils and with dioxin analysis using the YORK/WESTON REM-MS2 mobile GC/MS/MS system.

This document reports the results of the field demonstration in Times Beach. Process descriptions, test plans, sampling and analytical procedures, and test results are presented. The appendix to this report contains the run plan, a log of process operations, raw test data, laboratory reports, sample calculations, equipment calibration records, and profiles of key project participants.

SECTION 3
PROCESS DESCRIPTION

The HUBER AER employs a new technology which rapidly heats organic compounds to temperatures in the 4000°-5000°F range using intense thermal radiation in the near-infrared region.

Figure 3-1 presents a cross-section of the Advanced Electric Reactor (AER). Feed material is isolated from the reactor walls by means of a gaseous blanket formed by introducing nitrogen radially inward through the porous core walls. Organic compounds in the feed are pyrolytically reduced to elemental forms of carbon, hydrogen, oxygen, and chlorine.

Heat transfer is accomplished by radiative coupling from the core to the feed materials. The reactor core is heated by graphite electrodes.

The only feed streams to the reactor are the contaminated soil and the blanket nitrogen gas. Destruction of dioxins is accomplished by pyrolysis rather than oxidation. Therefore, typical incineration products such as carbon dioxide, oxides of nitrogen, and others are formed, if at all, in insignificant concentrations. The treated soil is a detoxified granular sand-like material.

Figure 3-2 shows a simplified process diagram for the Times Beach demonstration unit. The feed material is introduced at the top of the reactor by means of a metering screw feeder connecting the sealed bin to the reactor. Nitrogen is introduced to the reactor annulus formed by the external containment vessel and the porous graphite core.

The solid feed passes through the reactor undergoing organic pyrolysis at over 4000°F. The gaseous reactor emissions and the granular solids pass through a radiatively cooled post-reactor zone. The treated soil as a granular solid is collected in a sealed insulated vessel.

Fine particulates suspended in the gaseous emissions are collected in a baghouse. A series of two activated carbon canisters provide for removal of any trace residual PIP's.

Flue gas flow is measured by a calibrated dry gas test meter downstream of the carbon beds. The clean flue gas, composed almost entirely of nitrogen and moisture, is emitted to the atmosphere.

BEST COPY

WESTON

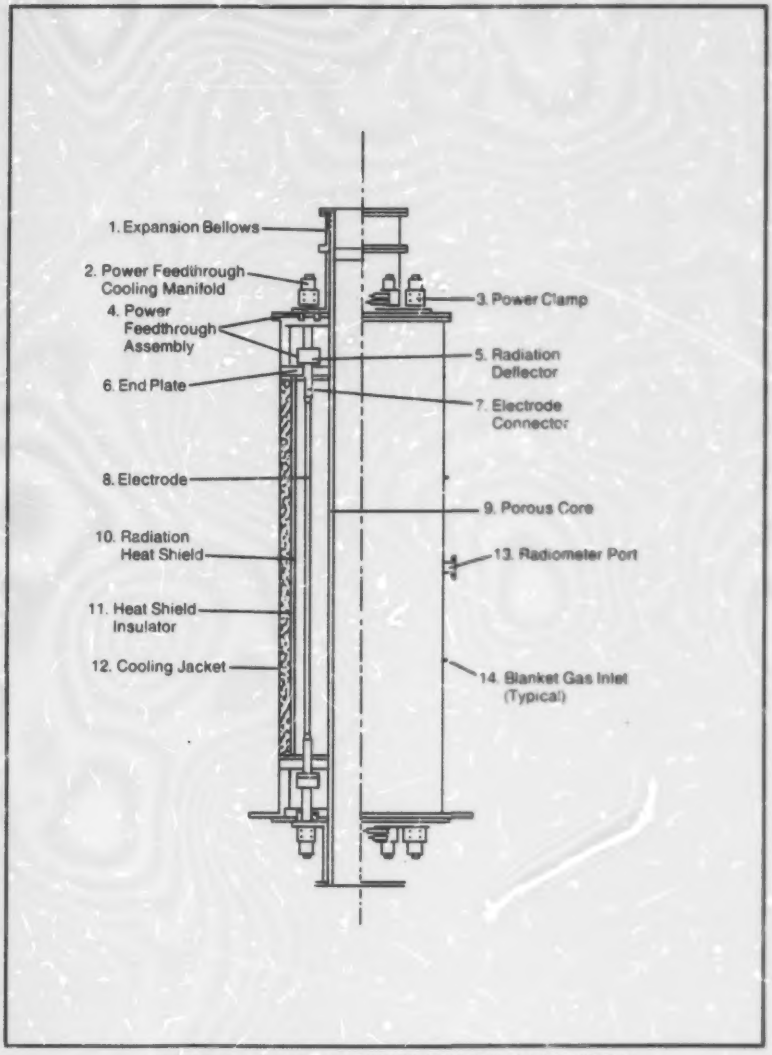

FIGURE 3-1 VERTICAL CROSS-SECTION OF ADVANCED ELECTRIC REACTOR

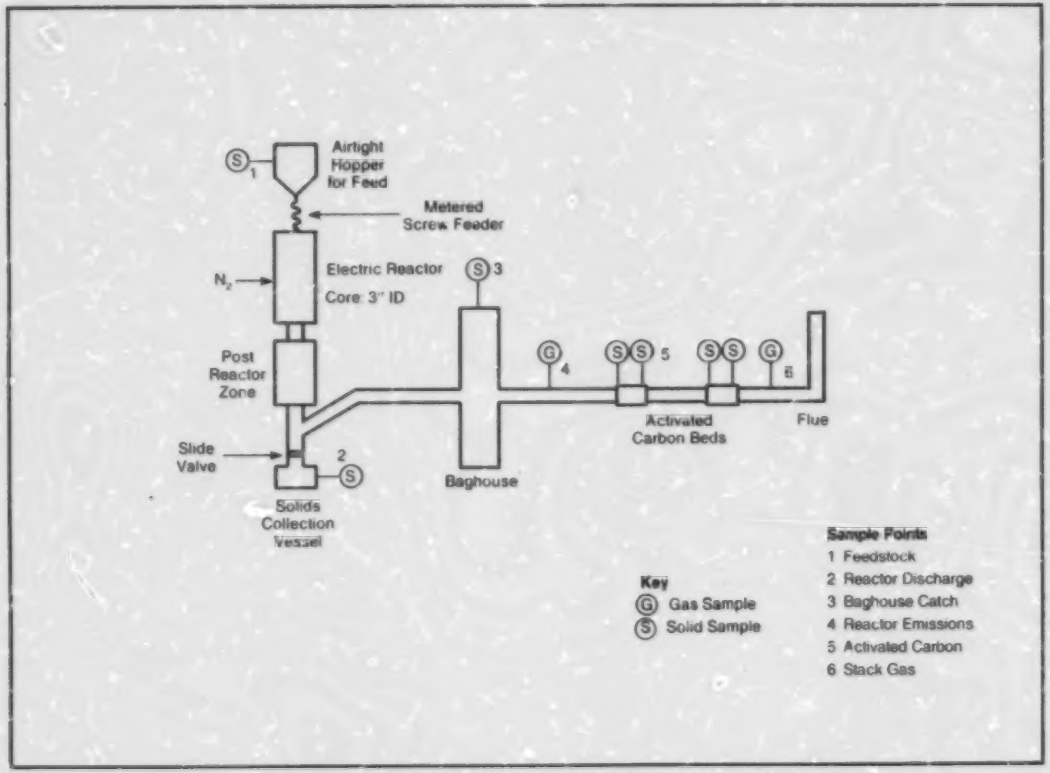

FIGURE 3-2 PROCESS SCHEMATIC WITH SAMPLING LOCATIONS SHOWN

150

SECTION 4
TEST PLAN AND PROJECT PERSONNEL

4.1 TEST PLAN

The test plan called for a series of three runs to take place in Times Beach, Missouri, using native soil contaminated with 2,3,7,8-TCDD and other dioxin isomers. The Times Beach runs were to be a public demonstration of the HUBER technology and as such required a firmly cast test plan.

The primary test plan and QA/QC plan documents prepared by WESTON are listed in References 3 and 4. These documents address sampling and analytical procedures including preparations, testing and equipment, confirmation of final results, and reporting of the project. Virtually all the details of these plans are presented in Section 5. HUBER process operation plans and run plans are outlined in Appendix A.

Table 4-1 presents the sampling plan for the Times Beach Test. The corresponding performance table is presented in Section 5, Table 5-2. The original sampling plan, found in Table 2-1 of the Test Plan (Reference 3), was modified slightly upon experience gained in the preliminary dioxin tests in Borger, Texas. For example, inter-test feedstock samples and baghouse catch samples were eliminated for reasons relating to safety and industrial hygiene.

The Times Beach test plans were rigorously followed by all project personnel.

4.2 INDUSTRIAL HYGIENE PLAN

The "Industrial Hygiene and Safety Plan" (Reference 5) addressed three tasks. The first was training of HUBER employees in appropriate procedures and methods for handling dioxin. The second provided for an on-site qualified industrial safety person with specific dioxin-related field experience. The third task detailed atmospheric dioxin monitoring, personnel exposure, and equipment decontamination procedures. Table 4-2 presents the Industrial Hygiene Sampling Plan. The corresponding table of performance results is presented in Section 5, Table 5-3.

4.3 PROJECT PERSONNEL

The project team organizational chart is presented in Figure 4-1, and the field team organizational chart is shown in Figure 4-2. Profiles of key project participants are provided in Appendix G.

TABLE 4-1

SAMPLING METHODOLOGY AND FREQUENCY OF SAMPLING

SAMPLING METHODOLOGY	SAMPLING POINT	NUMBER OF SAMPLES PER RUN RUN #1	RUN #2	RUN #3
Process gas: centerpoint, constant rate, integrated	Reactor emissions	1_1	1_1	1_1
Process gas: centerpoint, constant rate, integrated	Stack emissions	1_2	1_2	1_2
Thief Modified SW846EPA**	Feed bin	10_2	*	*
Scoop Modified SW846EPA**	Collection vessel	1_1+D_3	1_1+D_3	1_1+D_3
Scoop Modified SW846EPA**	Baghouse	*	*	4_2
Total		13 D	3 D	7 D

Subscripts:

D = Duplicates

1 = First priority analysis
2 = Second priority analysis
3 = Analyze only upon request

*Feedstock samples were all to be taken prior to connecting the feed bin to the reactor before the runs. One baghouse sample was to be taken from each of the four baghouse bags following the third run.

**Reference 16: SW 846 EPA document.

BEST COPY AVAILABLE

TABLE 4-2

INDUSTRIAL HYGIENE SAMPLING PLAN

	PRETEST	TEST	DECON
A. Feeder hopper			1
B. Charge end of reactor		1	
C. Discharge end of reactor		1[1]	
D. Collection vessel			1
E. Air pollution control system - inside first elbow		1	
F. Air pollution control system - discharge		1[2]	
G. Flat surface near reactor charge		1	
H. Flat surface in discharge area		1[3]	
I. Additional sample		1	
- Pretest wipe sample	1		
- Pretest wipe sample	1		
Air Samples			
A. Hi-vol at control panel		1	
B. Hi-vol at trailer door		1	
C. Personal at reactor feed		1	
D. Personal at reactor discharge		1	

Footnotes:

1. Analyze C only if D or F positive.
2. Analyze F only if E and G positive.
3. Analyze H only if G positive.

BEST COPY AVAILABLE

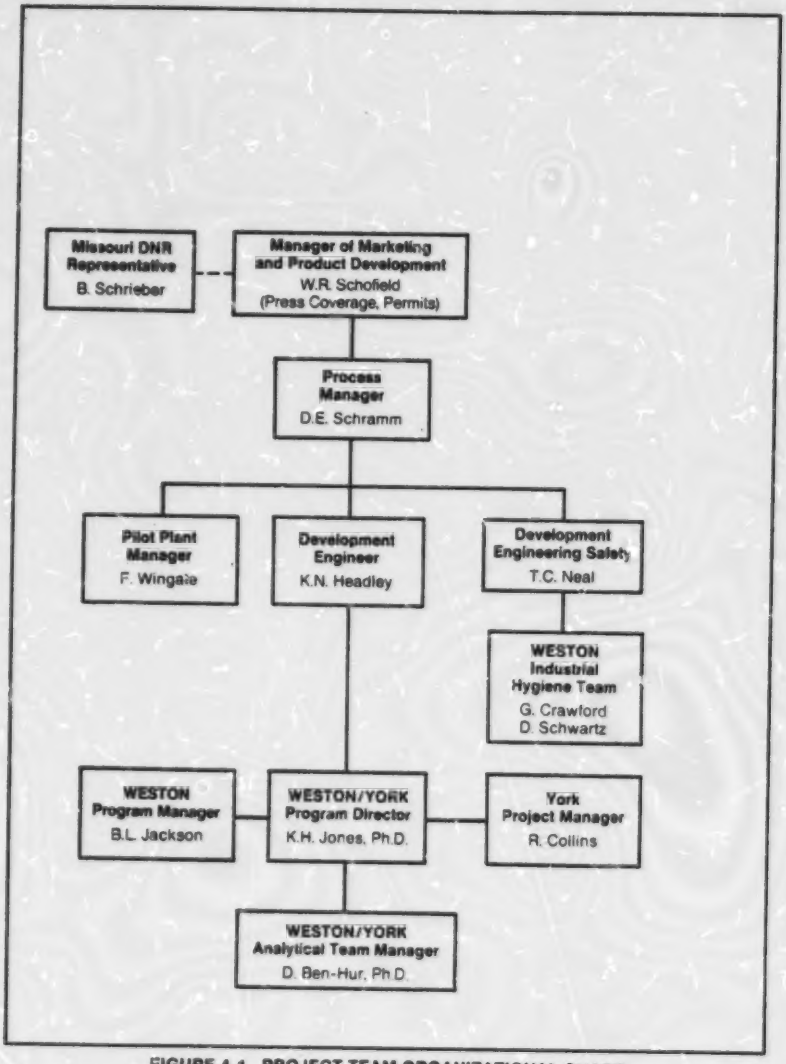

FIGURE 4-1 PROJECT TEAM ORGANIZATIONAL CHART

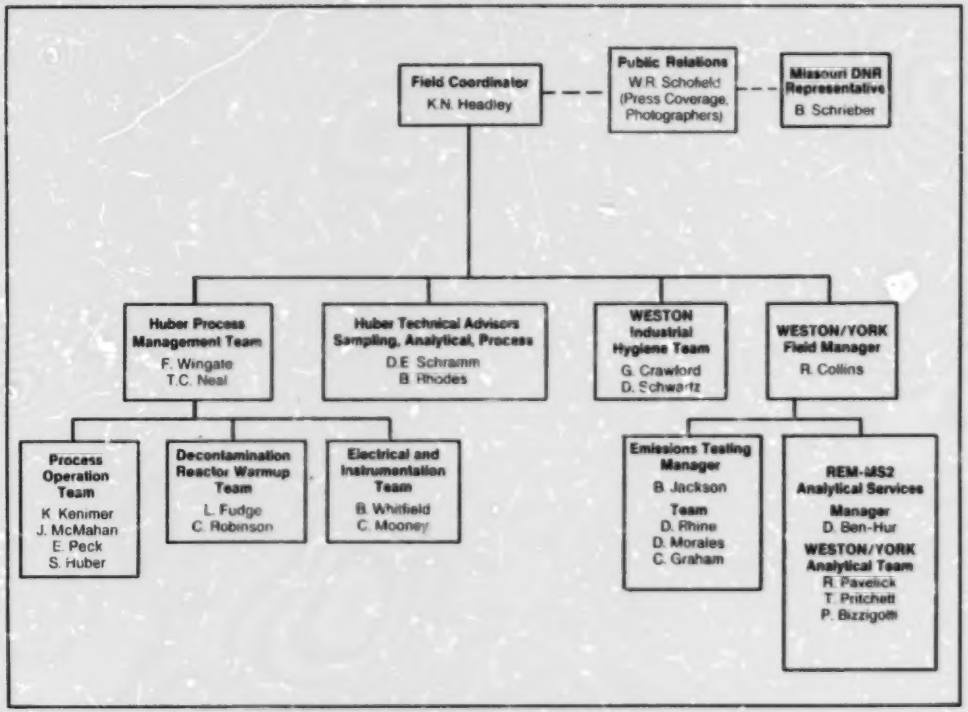

FIGURE 4-2 FIELD TEAM ORGANIZATIONAL CHART

155

SECTION 5
ON-SITE PERFORMANCE

This section provides details of process operating parameters, sampling and analytical equipment/procedures, and industrial hygiene monitoring. Analytical results determined or calculated are presented and discussed in Section 6.

5.1 OPERATING PARAMETERS

For each of the three runs, the reactor core temperature as indicated on a radiometer was held between 4100° and 4200°F. Total nitrogen rates were set at 4-5 scfm prior to the testing. During the first ten minutes of each run, feed rates were adjusted by the operations team. The run plan provided for feed rates of .25 lb/min, and the actual rates were .225, .313, and .332 lb/min, respectively for the three runs. Gas stream emissions sampling was initiated as soon as the operations team confirmed that a steady state feed rate and steady state process conditions were achieved. Table 5-1 presents the operating parameters for each run.

5.2 FREQUENCY OF SAMPLING AND ANALYSIS

Table 5-2 presents the frequency of sampling and analysis activities corresponding to the sampling plan of Table 4-1. Sampling was performed as planned. Analyses were performed as described in the documents "Test Plan" (Reference 3) and "QA/QC Plan" (Reference 4) and as described in Section 5.3.

5.3 SAMPLING AND ANALYTICAL PROCEDURES

5.3.1 PROCESS STREAM SOLIDS SAMPLING PROCEDURES

Solids samples were collected by the HUBER engineer D. Schramm or W. Rhodes with assistance from the HUBER process manager, F. Wingate or T. Neal. Sampling was witnessed by the YORK/WESTON field manager, R. Collins, and the industrial hygienist, G. Crawford or D. Schwartz.

Feedstock

Prior to the test period, thirteen representative 20g feedstock samples were taken using Scoop Method M-SW846EPA (Reference 16) as the feed bin was being loaded. These were transferred into 40 ml teflon septum bottles.

Treated Soil

Following each of the three triplicate runs, four 20g granular treated soil samples were retained in 40 ml teflon septum bottles and a 200g sample of fused soil discharge was secured in a 500 ml amber teflon septum jar using Scoop Method M-SW846EPA (Reference 16).

Baghouse Catch

Following the test period, one 20g sample was taken from each of the four primary baghouse compartments using Scoop Method M-SW846 EPA (Reference 16). These four samples were stored in 500 ml amber teflon septum jars.

Activated Carbon

Before the tests were initiated, one 20g activated carbon sample was taken from the top and bottom of each activated carbon canister using the thief technique M-SW846 EPA (Reference 16). Following the test period, four corresponding samples were obtained. These samples were stored in 40 ml teflon septum bottles.

5.3.2 PROCESS STREAM SOLIDS ANALYTICAL PROCEDURES

Each process stream solids sample, except the activated carbon, was analyzed for dioxin content and chlorinated organics or PIP's using the YORK/WESTON REM-MS2 GC/MS/MS. Preliminary dioxin tests in Borger, Texas, indicated that the retention of the stable-label 2,3,7,8-TCDD spike on the carbon during extraction interfered with the analytical techniques for measuring dioxin in the samples. This indicates how effective the carbon is at preventing dioxins and PIP's from being emitted to the atmosphere.

Dioxin

The analytical method for 2,3,7,8-tetrachlorodibenzo-p-dioxin in soil is shown in the Test Plan (Reference 3) and as follows.

The surrogate standard and parent and daughter ions were:

	Parent Ion m/z	Daughter Ion m/z
Surrogate, $C_{12}O_2H_4{}^{37}Cl_4$	328	263

Five grams of the feedstock, treated soil, or baghouse catch samples were spiked with 20 ug of the surrogate 2,3,7,8-TCDD stock spiking solution. They were then extracted with an acetonitrile-dichloromethane mixture using a continuous agitation technique for about 30 minutes. The resulting solutions were concentrated to a final volume of between 50 and 1000 ul and an aliquot injected into the GC/MS/MS for analysis. Extraction efficiency was confirmed by standard spiking technique.

PIP's

Determination of chlorinated organics or PIP's (products of incomplete pyrolysis) required a second injection of the concentrated extract into the GC/MS/MS. The first step of this analysis required setting the instrument to monitor and identifying the molecular weight of all species capable of a neutral loss of chlorine. When the screening for neutral loss of chlorine showed positive results, a third injection was made with the

instrument set to transmit through the first quadrupole those parent masses that exhibited the neutral loss of chlorine. The third quadrupole was set to analyze the fragments of each such parent compound, thus producing a mass spectrum for each chlorinated organic in the extract. Identification of each PIP was based on the mass spectrum of the compound.

5.3.3 GASEOUS EMISSIONS SAMPLING PROCEDURES

Triplicate emissions sampling was conducted by the YORK/WESTON Emissions Testing Team at two points. Refer to the Field Team Organizational Chart, Figure 4-2, and the Process Schematic, Figure 3-2.

The reactor emissions duct was downstream of the baghouse. Preliminary dioxin tests in Borger, Texas, indicated that the sampling train could not operate under the particulate load upstream of the baghouse. The stack emissions duct was on the flue, and stack emissions were sampled as discharged to the atmosphere.

Emissions from these two ducts were sampled simultaneously at the centerpoints and at a constant rate of 0.6 cubic feet per minute for 45 to 60 minutes to obtain integrated samples. Sampling for particulate, dioxin, PIP's, HCl, and moisture followed EPA Modified Method 5 (MM5) (Reference 2). The sampling train as shown in Figure 5-1 consisted of the following components connected in series:

- A 316 stainless steel nozzle 5/8" or 1" inside diameter, sized for approximate isokinetic sampling. (The 5/8" I.D. nozzle was used in the stack sampling.)

- An unheated 316 stainless steel thimble holder containing a preweighed glass fiber thimble-type filter meeting the 99.95 percent DOP (dioctylpthalate) efficiency test.

- An unheated 316 stainless steel probe attached to an impinger train via borosilicate tubing.

- An impinger train consisting of a Grahm (spiral type) ice water cooled condenser, an ice water jacketed sorbent module containing a 40 ml volume of 30/60 mesh XAD-2 (pre-extracted), a temperature sensor, a one liter condensate trap, two HCl traps each containing 100 ml of 0.1 N NaOH, and a final impinger containing 200g of dry silica gel.

- An umbilical cord connecting the outlet of the impinger train to a Nutech Control Module.

- A control module containing a 3 cfm carbon vane vacuum-pressure pump, a calibrated dry gas meter, a calibrated orifice, and inclined manometers.

- A switchable, calibrated digital pyrometer to monitor sample gas temperatures.

Figure 5-2 presents the MM5 train sampling procedures flow chart. Sampling for CO2, O2, and CO content of the stack emissions also took place during soil treatment and immediately following the gaseous emissions sampling. Analyses were performed by the Orsat method. The Orsat apparatus consisted of the following components:

- A stainless steel probe with a plug of glass wool to remove particulate.
- A squeeze bulb with flexible tubing to move the sample gases to the analyzer.
- An Orsat analyzer.

The carbon monoxide content of the stack emissions was also checked using NIOSH certified detector tubes. Preliminary dioxin tests in Borger, Texas, indicated that CO levels would be in the detector tube range, up to 3000 ppm. The Orsat detection limit was 1000 ppm for CO, CO2, or O2. The Orsat was leak-checked prior to and following each analysis.

5.3.4 GASEOUS EMISSIONS ANALYTICAL PROCEDURES

Each MM5 train, including a blank which was set up and sealed for the duration of the test, was recovered in a clean area remote from the operation. It was presented to the laboratory for determination of particulate, dioxin, PIP's, HCl, and moisture. Figure 5-3 presents the sample recovery procedures flow chart and Figure 5-4 presents the preparation procedures flow chart.

Recovery and Preparation

Material collected in the nozzle, in the front half of the filter holder, and in the glass fiber thimble was first analyzed gravimetrically for particulate and then the residues were solvent extracted. The extract of the front half catch was combined with the rinses/extract of the probe, connectors, condenser, and sorbent for determination of dioxin and PIP's. The liquid from the condensate trap and from the impingers containing NaOH, plus associated component rinses, was combined and analyzed for HCl. Moisture content was determined by measuring the increase in weight/volume of the impinger contents.

Dioxin and PIP's

The analysis for dioxin and PIP's proceeded as follows:

- The preweighed spiked thimble was placed in an amber jar and the post thimble rinse added (sample type 3). The thimble-rinsate mixture was stirred for half an hour with a magnetic stir bar with the jar sealed. When necessary, additional methylene chloride was added to assure recovery of dioxin from the thimble and particulate.

- The slurry from the preceding step was filtered through a teflon membrane filter with rinsing. The fraction of the solvent equal to that reserved from the front half rinse (90 percent) was combined with the remaining filtered (teflon membrane) front half rinse.

- The XAD-2 (sample type 4) was extracted for one-half hour with a volume of toluene equal to 1-2 times the trap volume in a sealed jar using a magnetic stir bar. The extract was filtered through a teflon membrane filter with rinsing, combined with the sample from the preceding step to form a single analytical sample, then gently reduced in volume to 200 ul under a stream of nitrogen.

- A 2-5 ul aliquot of the preceding sample was analyzed on the calibrated GC/MS/MS system. The detection limit was approximately 0.5 ng per injection.

- The PIP's were determined using the GC/MS/MS by analyzing another 2-5 ul aliquot of the concentrated sample. For more explanation see Section 5.3.2.

Particulates

The analysis procedure and calculations for particulate determinations were performed as specified in Sections 4 and 6 of EPA Method 5, respectively, with some modifications and are as follows:

- All loose particles contained in the nozzle were quantitatively transferred to the thimble.

- The thimble was removed from the holder and placed in a sealed amber teflon septum jar (sample type 1).

- The inside surfaces of the sampling train components prior to the thimble (nozzle and front of holder) were rinsed/brushed in triplicate with a total of approximately 50 ml of methylene chloride and the wash placed in an amber glass container fitted with a teflon-lined closure (sample type 2).

- The inside surfaces of the sampling train components downstream of the thimble but prior to the sorbent module (back-half thimble holder, probe, connectors, and condenser) were rinsed in triplicate with methylene chloride and the wash placed in an amber glass/teflon container (sample type 3).

- The XAD-2 module was sealed with ground glass caps (sample type 4).

- In the laboratory, the thimble and sample type 2 were each injected with 100 ul of 2,3,7,8-TCDD spiking mixture. The thimble was allowed to air dry.

BEST COPY AVAILABLE

- The thimble was desiccated at ambient temperature and pressure, then weighed to the nearest 0.1 mg to constant weight. "Constant weight" means a difference of no more than 0.5 mg or 1 percent of total weight less tare weight, whichever is greater, between two consecutive weighings performed at least two hours apart.

- A 10 percent aliquot of agitated sample type 2 was placed in a tared beaker, evaporated to dryness at ambient temperature and pressure, desiccated, and then weighed to a constant weight on an analytical balance to the nearest 0.1 mg. The remainder of the front half rinse (90 percent of original sample) was reserved for chemical analysis.

The total weight of material measured in the front half methylene chloride wash fraction (based on the entire sample) plus the weight of material collected in the glass fiber thimble represents the particulate catch for each run. Solvent blank corrections were made on all wash sample weights.

HCl

Analysis of the HCl collected in the condensate trap and in the impingers containing 0.1 N NaOH was done according to the argentometric method described in the 15th Edition of "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association in 1980 (Reference 8). The total volume of the impinger/rinse liquid sample was adjusted to 300 ml with distilled water and a 50 ml aliquot titrated with silver nitrate to determine its inorganic chloride content. The titration was repeated with a second aliquot of sample and the values averaged. Replicate titrations had to agree within 1 percent or 0.2 ml, whichever was greater. A blank was also run on the 0.1 N NaOH used in the impinger trains. Chloride standard and reagent blank samples were analyzed in like manner with each batch of field samples to establish lab data validity.

Dry Gas Composition, CO2, O2, CO

Analytical procedures for CO2, O2, and CO determinations were performed as specified in Section 4 of EPA Method 3 (Reference 1).

5.4 INDUSTRIAL HYGIENE MONITORING

Area air samples were collected on mixed cellulose ester filters using personal and high-volume sampling pumps during all test periods. They were analyzed for dioxin by on-site GC/MS/MS to document that worker exposure levels to dioxin were within established limits. The analytical data obtained for the industrial hygiene program is presented in Table 5-3. Equipment surface wipe tests were performed to establish adequacy of decontamination activities prior to moving equipment or lifting Level C personnel safety equipment requirements.

Safety practices from EPA Method 613 Section 4.3.1.9, July 1982, (Reference 7) states:

> Wipe tests: A useful method of determining cleanliness of work surfaces and tools is to wipe the surface with a piece of filter paper. Extraction and analysis by gas chromatograph can achieve a limit of sensitivity of .1 ug (100 ng) per wipe. Less than 1 ug (1000 ng) 2,3,7,8-TCDD per sample indicates acceptable cleanliness.

Note that the GC/MS/MS analysis achieved sensitivities of less than one nanogram and no dioxin was found on any wipe sample at this level, three orders of magnitude less than the EPA standard.

TABLE 5-1

PROCESS OPERATING PARAMETERS

	RUN 1	RUN 2	RUN 3
Duration, minutes	89	82	54
Feed rate, lb/min	.225	.313	.332
Estimated* treated soil rate, lb/min	.168	.234	.248
Estimated* particulate rate, lb/hr	0.46	0.64	0.68

	TEST PARAMETERS
Reactor core temperature, °F	4100-4200
Nitrogen rate, scfm	4.78
Feedstock charge, lb	63.58
Treated soil discharged, lb	47.49
Bag filter catch, lb	1.62

*Estimated values were used in calculating mass rates for Table 5-3. Values for treated soil rate and particulate data were estimated from the known feed rate by the ratio of the total treated soil or particulates discharged to the total feedstock charged.

TABLE 5-2

PERFORMANCE
FREQUENCY OF SAMPLING AND ANALYSIS FOR DIOXIN

SAMPLING METHODOLOGY	SAMPLING POINT	NUMBER OF ANALYSES PER RUN RUN #1	RUN #2	RUN #3
Process gas: centerpoint, constant rate, integrated	Reactor emissions	1	1	1
Process gas: centerpoint, constant rate, integrated	Stack emissions	1	1	1
Thief Modified SW846EPA**	Feed bin	13	*	*
Scoop Modified SW846EPA**	Collection vessel 1. Granular 2. Aggregate	4 1	4 1	4 1
Scoop Modified SW846EPA	Baghouse	*	*	4
Total		20	7	11

*Feedstock samples were all taken prior to connecting the feed bin to the reactor before the runs. One bag filter sample was taken from each of the four baghouse bags following the third run.

**Reference 16.

BEST COPY AVAILABLE

TABLE 5-3

INDUSTRIAL HYGIENE MONITORING:
2,3,7,8-TCDD PERFORMANCE RESULTS

	PRETEST (ng)	DURING TEST (ng)	(hrs)	(ng/m³)	AFTER DECONTAMINATION (ng)
Sample Location or Type:					
A. Feed hopper					< 0.55
B. Charge end of reactor		< 0.55			
C. Discharge end of reactor		< 0.55			
D. Collection - vessel					< 0.55
E. Air pollution control system - Inside first elbow					Not run
F. Air pollution control system - Discharge after carbon beds					Not run
G. Platform near charge end	< 0.55	< 0.55			
H. Wipe sample of trailer floor after final sweep-up					< 0.55
I. Electrical cable tray	< 0.55	< 0.55			
Respirator Filters:					
Tom Neal					Not run
Air Sample Pump Type/Location:					
A. Hi-vol/near collection vessel		< 0.55	8.53	< 0.002	
B. Personal/near cable tray[a]		< 1.1	8.75	< 0.88	
C. Personal/near feed		< 0.55	8.82	< 0.44	
D. Personal/above collection vessel and beneath reactor		< 0.55	9.07	< 0.42	
Personal/field blank	< 0.55				
Hi-vol/field blank	< 0.55				

[a] Failed laboratory quality assurance procedures.
NOTE: Samples "Not run" were not analyzed because: (1) their analysis was not required by the Industrial Hygiene Sample Plan as noted in Table 4-2 or (2) decisions were made on-site not to analyze them.

BEST COPY AVAILABLE

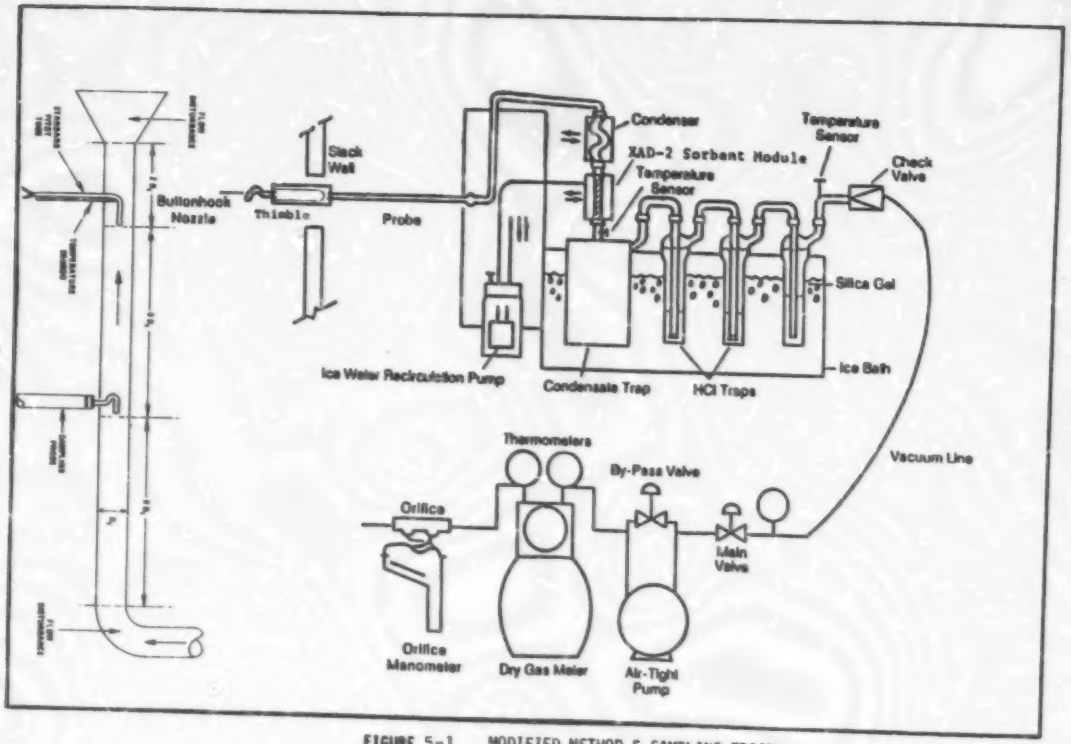

FIGURE 5-1 MODIFIED METHOD 5 SAMPLING TRAIN FOR PARTICULATE, DIOXIN, PIP's, HCl AND MOISTURE

166

ATTACH NOZZLE TO FILTER HOLDER, FILTER HOLDER TO PROBE, PROBE TO CONDENSER/ CONDENSATE TRAP WITH GLASS CONNECTORS
TRANSPORT SAMPLING TRAIN TO TEST POINT
CONNECT UMBILICAL TO CONTROL MODULE, CONNECT IMPINGER #3 OUTLET TO UMBILICAL, CONNECT XAD-2 MODULE TO OUTLET OF CONDENSER AND TO INLET OF CONDENSATE TRAP. USE CONNECTORS TO JOIN EXIT OF CONDENSATE TRAP AND IMPINGERS IN SERIES
ZERO INCLINED MANOMETERS
LEAK CHECK ASSEMBLED SAMPLING TRAIN AT 15" HG AT FRONT OF NOZZLE
RECORD LEAK CHECK ON FIELD DATA SHEET
ADD ICE TO IMPINGER TRAIN AND START ICE-WATER RECIRCULATION PUMP
TEAM LEADER CHECK WITH PROCESS OBSERVER FOR START TIME
HUBER ENGINEER MAKES SURE PROCESS OPERATING NORMALLY
PROBE POSITIONED IN TEST PORT AT FIRST SAMPLING POINT
REMOVE SAMPLE PORT AND PROBE CAPS, INSERT PROBE THROUGH PORT, SEAL PORT
RECORD CLOCK TIME, RECORD INITIAL DRY GAS METER, READ ΔP, Ts, AND Tm, AS APPROPRIATE, FOR ISOKINETIC SAMPLING: DETERMINE ΔH, SET ΔH AT ORIFICE METER, READ REMAINING GAUGES
START TEST AT DESIGNATED START TIME
PROCESS OBSERVER TAKES DATA THROUGHOUT THE TEST
RECORD DATA ON FIELD DATA SHEET AT EACH POINT EVERY 5 MINUTES
SAMPLE AT CENTERPOINT FOR FOR 45 TO 60 MINUTES
STOP SAMPLING AND REMOVE PROBE FROM TEST PORT
RECORD FINAL DRY GAS METER READING AND LEAK CHECK

FIGURE 5-2

SAMPLING PROCEDURES FOR PARTICULATE, DIOXIN, PIP'S, HCl, AND MOISTURE SAMPLING TRAIN

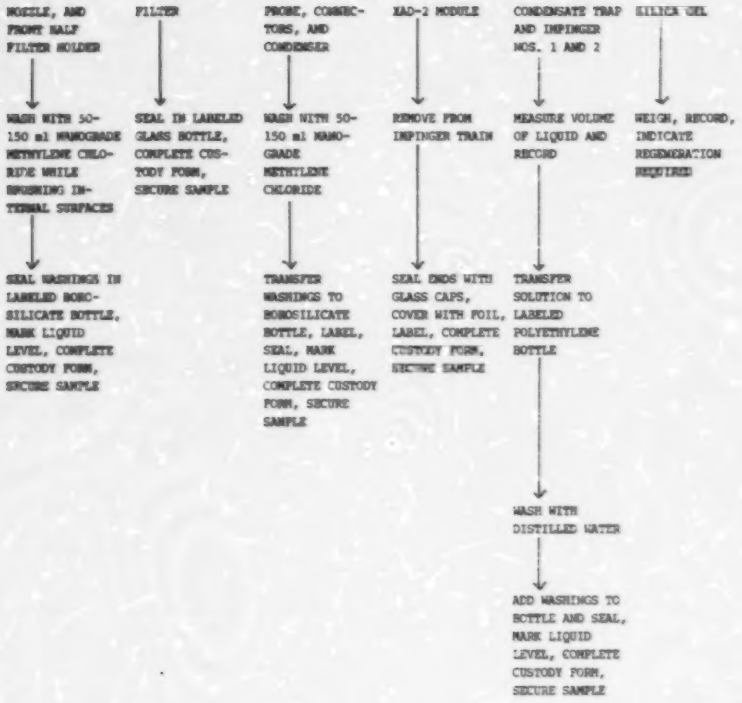
NOZZLE, AND FRONT HALF FILTER HOLDER
WASH WITH 50-150 ml MANOGRADE METHYLENE CHLORIDE WHILE BRUSHING INTERNAL SURFACES
SEAL WASHINGS IN LABELED BOROSILICATE BOTTLE, MARK LIQUID LEVEL, COMPLETE CUSTODY FORM, SECURE SAMPLE
FILTER
SEAL IN LABELED GLASS BOTTLE, COMPLETE CUSTODY FORM, SECURE SAMPLE
PROBE, CONNECTORS, AND CONDENSER
WASH WITH 50-150 ml MANOGRADE METHYLENE CHLORIDE
TRANSFER WASHINGS TO BOROSILICATE BOTTLE, LABEL, SEAL, MARK LIQUID LEVEL, COMPLETE CUSTODY FORM, SECURE SAMPLE
XAD-2 MODULE
REMOVE FROM IMPINGER TRAIN
SEAL ENDS WITH GLASS CAPS, COVER WITH FOIL, LABEL, COMPLETE CUSTODY FORM, SECURE SAMPLE
CONDENSATE TRAP AND IMPINGER NOS. 1 AND 2
MEASURE VOLUME OF LIQUID AND RECORD
TRANSFER SOLUTION TO LABELED POLYETHYLENE BOTTLE
WASH WITH DISTILLED WATER
ADD WASHINGS TO BOTTLE AND SEAL, MARK LIQUID LEVEL, COMPLETE CUSTODY FORM, SECURE SAMPLE
SILICA GEL
WEIGH, RECORD, INDICATE REGENERATION REQUIRED

FIGURE 5-3

SAMPLE RECOVERY PROCEDURES FOR PARTICULATE, DIOXIN, PIP'S, HCl, AND MOISTURE

BEST COPY AVAILABLE

GLASSWARE: CONDENSER, CONDENSATE TRAP, CONNECTORS
FIBERGLASS THIMBLES
STAINLESS STEEL PARTS: NOZZLE, PROBE, AND FILTER HOLDER
GLASSWARE: XAD-2 SORBENT MODULES AND CAPS
XAD-2
WASH IN SOAP AND WATER, RINSE WITH DISTILLED WATER, RINSE WITH NANO-GRADE ACETONE, RINSE WITH NANO-GRADE METHYLENE CHLORIDE
WASH IN SOAP AND WATER, RINSE WITH DISTILLED WATER, RINSE WITH NANO-GRADE ACETONE, RINSE WITH NANO-GRADE METHYLENE CHLORIDE, MUFFLE AT 450°C FOR 4 HOURS
CLEAN IN SOXHLET WITH DISTILLED WATER, PESTICIDE GRADE METHANOL, AND NANOGRADE TOLUENE FOR 24 HOURS
REMOVE SURFACE RESIDUALS AND SILICONE GREASES BY SOAKING IN HOT CHROMIC ACID CLEANING SOLUTION, RINSE WITH TAPWATER, WASH IN SOAP AND WATER, RINSE WITH DISTILLED WATER, RINSE WITH NANO-GRADE ACETONE, RINSE WITH NANO-GRADE METHYLENE CHLORIDE
BAKE IN 200°C OVEN FOR 2 HOURS, SEAL WITH GLASS CAPS OR WRAP ALL EXPOSED ENDS WITH ALUMINUM FOIL
PACK MODULE WITH XAD-2, PUT END CAPS ON CONTAINERS AND COVER WITH ALUMINUM FOIL
TRANSPORT TO JOB SITE
RETAIN SAMPLES OF DISTILLED WATER AND 0.1N NaOH FOR BLANK DETERMINATIONS
CHARGE IMPINGER TRAIN
IMPINGER NO. 1 AND NO. 2 WITH 100 ml EACH OF 0.1 N NaOH; IMPINGER NO. 3 200 GRAMS DRY SILICA GEL
RINSE CONDENSATE TRAP AND FIRST TWO IMPINGERS WITH DISTILLED WATER
COMPLETE ASSEMBLY OF TRAIN
SEAL OPEN ENDS OF IMPINGERS AND NOZZLE WITH GLASS PLUGS AND ALUMINUM FOIL, RESPECTIVELY
TRANSPORT TO TEST POINT

FIGURE 5-4

PREPARATION PROCEDURES FOR PARTICULATE, DIOXIN, PIP'S, HCl, AND MOISTURE SAMPLING TRAIN

SECTION 6
RESULTS AND CONCLUSIONS

The Huber Technology Group of J. M. Huber Corporation demonstrated the ability of their AER to destroy 2,3,7,8-TCDD present in native contaminated soil at the Times Beach Superfund site in St. Louis County, Missouri. The tests were conducted November 13, 1984.

To determine the degree of success of the Times Beach dioxin test, the contaminated soil feedstock and the treated soil were sampled and analyzed for 2,3,7,8-TCDD on state-of-the-art analytical equipment: the YORK/WESTON REM-MS2 Mobile GC/MS/MS system. Treated soil was certified to be free of 2,3,7,8-TCDD against detection limits at least an order of magnitude below the 1 ppb (1 ng/g) standard established by the Missouri Department of Natural Resources.

In addition, gaseous emission parameters, including chlorinated organics, chlorine, and particulate loading were measured at the point of atmospheric discharge. Nothing was detected against detection limits at least two orders of magnitude below the EPA standards for hazardous waste disposal facilities.

The Industrial Hygiene Audit (Reference 6) demonstrates that no 2,3,7,8-TCDD was found in the local test environment: neither in the air after 8-9 hours of high volume sampling within the process enclosure; nor on the surfaces of the work area platform, floor, or inside the air pollution control system piping. The detection limits of these tests were over three orders of magnitude below the EPA standards.

6.1 PROCESS STREAM SOLIDS ANALYTICAL RESULTS

Dioxin

Table 6-1 presents a summary of dioxin datapoints including those for the feedstock, the treated soil, and the baghouse catch. Table 6-2 presents dioxin concentrations and mass flow rates. The feedstock averaged 79 ng/g 2,3,7,8-TCDD and the thirteen sample analyses ranged from 67.9 to 99.8 ng/g providing a standard deviation of ±10 ng/g.

No 2,3,7,8-TCDD was found in the treated soil at detection limits of 0.11 ng/g for ten sample analyses from Runs 1 and 2. The Run 3 detection limit is shown in Table 6-2 as a weighted average of five sample analyses at .14 ng/g.

No 2,3,7,8-TCDD was found in the baghouse catch. Samples from each of the four bags were analyzed following the test against a detection limit of .50 to .55 ng/g.

PIP's

Table 6-3 presents the chlorinated PIP results including those for the treated soil and the baghouse catch. No chlorinated

organics were detected in the treated soil against detection limits estimated at 17 to 25 ppb. The spectral scans indicate that traces of chlorinated phenols and possibly some other organics as indicated in the table were present in the reactor emissions and the baghouse catch; however, even if this were quantitatively confirmed, the levels would be much less than established standards for such materials. For example, the EPA cancer assessment guideline number for 2,4,6 trichlorophenol (the only chlorinated phenol which has been identified as a potential human carcinogen) indicates that it is 2200 times less toxic than 2,3,7,8-TCDD (Reference 15 and communications from Clemet Associates to Dr. Kay H. Jones).

HUBER has determined that the baghouse catch is a porous high surface area material and, as such, serves as a trap for fugitive reactor emissions. Therefore, in future commercial operations, this material would be mixed with feedstock material and recycled.

6.2 GASEOUS EMISSIONS ANALYTICAL RESULTS

Dioxin

Table 6-1 presents a summary of dioxin datapoints including those for the reactor emissions and the stack emissions. Table 6-2 presents dioxin concentration and mass flow rates including the destruction efficiency (DE, percent) determined from the reactor emissions data and the destruction and removal efficiency (DRE, percent) calculated from the stack emissions data.

No dioxin was found in the reactor emissions or the stack emissions at detection limits of .54 to .74 ng/m³. This provided DE's and DRE's of at least of 99.999 percent. The low flow rates utilized in this test prevented the demonstration of higher DRE's. Preliminary high flow rate commercial scale testing on Borger, Texas, using OCDD provided quantitative DE's and DRE's in the order of 99.99999 percent (seven nines), which is the expected destruction level for commercial AER process soil decontamination operations (References 11, 12, 13, and 14).

PIP's

Table 6-3 presents the chlorinated PIP's including those for the reactor emissions and the stack emissions. No chlorinated organics were detected in the stack gases against detection limits estimated at 25 ng/m³.

Fixed Gases, Moisture, Chlorine, Particulate Loading

Table 6-4 presents the results of stack emissions for CO, O2, CO2, H2O, HCl, and particulate loading.

No chlorine (as HCl) was detected at detection limits of .3 to .4 mg/m³. Chlorine emissions (less than 7.0×10^{-6} lb/hr) were six

orders of magnitude below the applicable EPA standard of 4 lb/hr (Reference 17).

No particulate matter was detected against detection limits of 1.0 to 1.3 mg/m³. For all runs, the particulate loading (less than 1.3 mg/dscm) was more than two orders of magnitude less than the EPA emissions limit of 180 mg/dscm (Reference 17).

The dry stack gases were comprised of nitrogen, about 2 percent carbon monoxide, and approximately 1 percent oxygen. The carbon monoxide levels were not expected and may be due to organic levels of approximately 7 percent in the feedstock (Appendix C). The Times Beach dioxin is in a matrix with heavy oils and tars. The oxygen levels are believed to result from slight air in-leakage to the Orsat sampling system.

Moisture content of the stack gases, seven-tenths of a percent by volume, was as expected due to the moisture content of the feedstock, about nine-tenths of a percent (Appendix C).

6.3 QUALIFICATION OF RESULTS

WESTON developed a detailed QA/QC Plan (Reference 4) for this program with the objective of producing quality data of known precision, accuracy, and completeness. The plan delineates responsibilities for quality control and defines quality criteria for all aspects of the program.

The analytical data were initially reported by the bench chemist or instrument operator. The spectral data from the analyses were then independently reviewed by the QA officer, Dr. David Ben-Hur. Finally, Dr. Kay Jones, the WESTON/YORK program director, reviewed all analytical results for compliance with the QA/QC procedures. Following completion of the confirmation process, all results were thoroughly evaluated and assessed. As a QA step, WESTON provided assistance in reviewing and confirming computations and conclusions.

6.4 CONCLUSIONS

The J. M. Huber Corporation has successfully demonstrated on-site treatment of soil contaminated with about 79 ppb of dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin or 2,3,7,8-TCDD) at the Times Beach Superfund site in St. Louis County, Missouri, using their Advanced Electric Reactor technology (AER process). The apparent absence of other documented successful dioxin tests strongly suggests that this is the world's first successful field demonstration of permanent dioxin destruction.

No 2,3,7,8-TCDD or chlorinated organics were measured at or above the detection limits in any effluent stream. Thus the AER process was proven to be a high performance system for permanent treatment of dioxin.

No 2,3,7,8-TCDD was found in the local test environment during nine hours of high volume sampling. Thus the AER process was proven to be sealed and functionally risk-free.

EPA standards for hazardous waste treatment facilities were excelled by at least two orders of magnitude for PIP's, chlorine emissions, and particulate loading, none of which were detected in the stack gases.

The Missouri DNR standard for 2,3,7,8-TCDD (1.0 ppb), based on CDC Standards (Center of Disease Control), was excelled by at least a factor of nine, in the treated soil discharge from the AER process (less than .11 ppb).

56-465 O—86——7

TABLE 6-1

SUMMARY OF 2,3,7,8-TCDD DATAPOINTS

TEST RUN #	SAMPLE ID	DESCRIPTION	TCDD (ng/g)	QC	COMMENT
1,2,3	T0FD01	Feedstock	71.1	OK	
1,2,3	T0FD02	Feedstock	89.0	OK	LSR
1,2,3	T0FD03D	Feedstock	73.3	OK	
1,2,3	T0FD04	Feedstock	99.8	OK	
1,2,3	T0FD05	Feedstock	84.9	OK	LSR
1,2,3	T0FD06	Feedstock	72.5	OK	
1,2,3	T0FD07	Feedstock	67.9	OK	
1,2,3	T0FD08	Feedstock	77.3	OK	LSR
1,2,3	T0FD09	Feedstock	71.3	OK	
1,2,3	T0FD10	Feedstock	73.6	OK	LSR
1,2,3	T0FD11	Feedstock	97.0	OK	LSR
1,2,3	T0FD12	Feedstock	71.6	OK	
1,2,3	T0FD13	Feedstock	74.7	OK	LSR
1,2,3	Average	Feedstock	79±10	--	--
1	T1PD01	Treated soil, granular	<0.11	OK	
1	T1PD02	Treated soil, granular	<0.11	OK	
1	T1PD03	Treated soil, granular	<0.11	OK	
1	T1PD04	Treated soil, granular	<0.11	OK	
1	58721	Treated soil, aggregate	<0.11	OK	
1	Average	Treated soil	<0.11	--	
2	T2PD01	Treated soil, granular	<0.11	OK	
2	T2PD02	Treated soil, granular	<0.11	OK	
2	T2PD03	Treated soil, granular	<0.11	OK	
2	T2PD04	Treated soil, granular	<0.11	OK	LSR
2	58730	Treated soil, aggregate	<0.11	OK	
2	Average	Treated soil	<0.11	--	
3	T3PD01	Treated soil, granular	<0.34	OK	
3	T3PD02	Treated soil, granular	<0.50	OK	
3	T3PD03	Treated soil, granular	<0.46	OK	
3	T3PD04	Treated soil, granular	<0.50	OK	
3	58731	Treated soil, aggregate	<0.11	OK	
3	Average	Treated soil	<0.14	--	
1,2,3	TFBF01	Bag filter catch, bag 1	<0.55	OK	
1,2,3	TFBF02	Bag filter catch, bag 2	<0.55	OK	
1,2,3	TFBF03	Bag filter catch, bag 3	<0.55	OK	LSR
1,2,3	TFBF04	Bag filter catch, bag 4	<0.50	OK	LSR
1	T1RE	Baghouse outlet duct	<0.54 ng/m³	OK	
2	T2RE	Baghouse outlet duct	<0.54 ng/m³	OK	
3	T3RE	Baghouse outlet duct	<0.74 ng/m³	OK	LSR
1	T1SE	Flue duct	<0.55 ng/m³	OK	LSR
2	T2SE	Flue duct	<0.55 ng/m³	OK	
3	T3SE	Flue duct	<0.71 ng/m³	OK	

LSR: Low surrogate recovery. Surrogate recovery was at or near the lower limits set by the QA/QC plan.

TABLE 6-2

DIOXIN CONCENTRATIONS AND MASS RATES, DE'S AND DRE'S

	RUN 1	RUN 2	RUN 3
Feedstock			
Concentration (ng/g)	79±10	79±10	79±10
Mass rate (ng/min)	8040	11,200	11,900
Treated Soil			
Concentration (ng/g)	< 0.11	< 0.11	< 0.14*
Mass rate (ng/min)	< 8.4	< 12	< 16
Bag Filter Catch			
Concentration (ng/g)	< 0.55	< 0.55	< 0.55
Mass rate (ng/min)	< 1.4	< 2.0	< 2.1
Reactor Emissions			
Concentration (ng/m^3)	< 0.54	< 0.54	< 0.74
Mass rate (ng/min)	< 0.07	< 0.07	< 0.10
DE %	> 99.9991	> 99.9993	> 99.9992
Stack Emissions			
Concentration (ng/m^3)	< 0.55	< 0.55	< 0.71
Mass rate (ng/min)	< 0.07	< 0.07	< 0.10
DRE %	> 99.9991	> 99.9993	> 99.9992

*Weighted average: 90% treated soil, aggregate
10% treated soil, granular

All < or > signs indicate that no dioxin was found at the analytical detection limit.

TABLE 6-3
PRODUCTS OF INCOMPLETE PYROLYSIS

	RUN 1	RUN 2	RUN 3
Treated Soil	*Trace dichlorophenol (Possibly chlorobenzene)	*None detected (Possibly chlorobenzene)	None detected
Reactor Emissions	None detected	Trace dichlorophenol (Possibly trichlorophenol)	None detected
Stack Emissions	None detected (Possibly chlorobenzene)	None detected	None detected
Bag Filter Catch All runs - end of test			Trace dichlorophenol (Possibly benzylmethylether)

*WESTON analyzed these two treated soil samples for chlorinated PIP's against an estimated detection limit of 25 ppb.

ERG (Environmental Research Group, Inc.) analyzed the same samples (and only the two shown) for all PIP's against a detection limit of 10 ppb. ERG data indicated no chlorinated organics at the lower detection limit.

Reports from both WESTON and ERG are presented in Appendix C.

BEST COPY AVAILABLE

TABLE 6-4

STACK EMISSIONS
FIXED GASES, MOISTURE, CHLORINE, PARTICULATE LOADING

	RUN 1	RUN 2	RUN 3
Dry Gas Composition (volume %)			
Carbon dioxide[b]	0.6	< 0.1	< 0.1
Oxygen[a]	1.6	1.1	1.1
Carbon monoxide	2.0	2.1	2.1
Nitrogen	96.4	96.8	96.8
Moisture Content (volume %)	0.7	0.7	0.7
Chlorine as HCl[b]:			
Concentration, mg/m^3	< 0.3	< 0.3	< 0.4
Mass rate, lb/hr x 10^{-6}	< 5.4	< 5.4	< 7.0
Particulate Loading[b,c]:			
Concentration, mg/m^3	< 1.0	< 1.0	< 1.3
Mass rate, lb/hr x 10^{-5}	< 1.8	< 1.8	< 2.3

a) Slight ambient air in-leakage to Orsat sampling system.

b) All < signs indicate results below analytical detection limit.

c) Standard conditions are 20°C and 760 mmHg.

REFERENCES

1. Code of Federal Regulations, 40 CFR 60, Appendix A, Reference Test Methods.

2. Harris, J. C., Larren, D. J., Rechsteiner, C. E., and Thurm, K. E., Sampling and Analysis Methods for Hazardous Waste Incineration, (First Edition), Arthur D. Little, Inc., Acorn Park, Cambridge, Massachusetts, February 1982.

3. Jones, K. H., and Jackson, B. L., Test Plan, Dioxin Destruction Tests, J. M. Huber Research Reactors, Roy F. Weston, Inc., West Chester, Pennsylvania, October 19, 1984.

4. Jones, K. H., and Jackson, B. L., QA/QC Plan, Dioxin Destruction Tests, J. M. Huber Research Reactors, Roy F. Weston, Inc., West Chester, Pennsylvania, October 5, 1984.

5. Crawford, G. M., and Schwartz, D., Industrial Hygiene and Safety Plan, J. M. Huber Hazardous Waste Treatment Demonstration, Roy F. Weston, Inc., West Chester, Pennsylvania.

6. Crawford, G. M., and Schwartz, D., Industrial Hygiene Audit, J. M. Huber Dioxin Thermal Destruction Tests, Roy F. Weston, Inc., West Chester, Pennsylvania, January 25, 1985.

7. Appendix II - Gas Chromatographic/Mass Spectrometric Methods: Muthods 613, 624, and 625, Federal Register/Vol. 44, No. 233/Monday, December 3, 1979/Proposed Rules, pps. 69526-69531.

8. 15th Edition of Standard Methods for the Examination of Water and Wastewater published by the American Public Health Association in 1980.

9. Quality Assurance Manual for Weston, December 1981.

10. Quality Assurance Handbook for Air Pollution Measurement Systems, Volumes I and III. U.S. EPA, August 1977, as amended.

11. Lewis, D. S., and Lee, K. W., Final Report, PCB R&D Burn Report for J. M. Huber Corporation, Radian Corporation, Austin, Texas. November 21, 1983.

12. Lee, K. W., and Lewis, D. S., J. M. Huber PCB Destruction Process Trial Burn Report, and Data Appendix Volumes 1 and 2, Radian Corporation, Austin, Texas, October 31, 1983.

13. Headley, K. N., Lee, K. W., Schofield, W. R., and Donovan, L. T., Parametric Study for the Destruction of Carbon Tetrachloride in the Huber Advanced Electric Reactor, prepared for the Texas Department of Water Resources, Huber Technology Group, Borger, Texas, June 22, 1984.

14. Jones, K. H., Jackson, B. L., Collins, R., and Ben-Hur, D., Demonstration of the Destruction of Dioxin in Contaminated Soils, Roy F. Weston, Inc., West Chester, Pennsylvania, February 7, 1985.

15. U.S. Environmental Protection Agency Cancer Assessment Guidelines as communicated to Dr. Kay Jones by Clemet Associates, Arlington, Virginia.

16. U.S. Environmental Protection Agency/Office of Solid Waste, Washington, D.C., Test methods for Evaluating Solid Waste-Physical/Chemical Methods, SW-846 1980, SW-846, Revision A (August 8, 1980) and SW-846, Revision B (July 1981).

17. Standards Applicable to Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities; Consolidated Permit Regulations, Federal Register/Vol. 47, No. 122/Thursday, June 24, 1982/Proposed Rules, pps. 27516-27535.

APPENDICES

Appendix A: Run Plan

Appendix B: Process Operations Logs

Appendix C: Raw Test Data

Appendix D: Lab Reports

Appendix E: Sample Calculations

Appendix F: Equipment Calibration Records

Appendix G: Profiles of Key Project Participants

APPENDIX B.—MATERIAL SUBMITTED BY ILLINOIS ENVIRONMENTAL PROTECTION AGENCY FOR INSERTION IN THE RECORD

INSERT 1

Illinois Environmental Protection Agency 2200 Churchill Road, Springfield, IL 62706

217/782-6762

October 10, 1985

Subcommittee on Energy, Environment & Safety
Issues Affecting Small Business
B363 Rayburn Hob
Washington, D.C. 20515

Dear Mr. Stenholm:

I am writing to provide testimony in support of the provisions of HR 3211. The Illinois Environmental Protection Agency believes it would be most beneficial if HR 3211 was amended onto a Superfund authorization bill now being considered by the Congress.

Illinois EPA has been a leader in promoting alternative treatment technologies and hazardous waste site cleanups. Illinois has its own State funded cleanup program. In that program, we provide financial preference to those cleanup proposals that landfill the least amount of hazardous waste and recycle, detoxify, incinerator or neutralize the greatest amount of hazardous waste. We are presently procuring the services of a mobile incinerator to use at State hazardous waste sites. We will have this technology ready for use during the 1986 construction season.

We have been trying to use this technology at NPL sites in Illinois. However, USEPA is reluctant to approve of the technology because it has not been field tested in advance and it is generally 2 to 4 times more expensive than landfilling options. I have asked Administrator Thomas to establish a task force to look into the issues of permitting mobile incinerators to be used at hazardous waste sites (letter attached).

HR 3211 will provide the needed encouragement for new technologies to be fairly evaluated in a real-world setting and thus allow those that are meritorious to be used at NPL sites. We must provide greater emphasis on higher technology solutions and get away from the landfilling mentality if we are to truly meet the original objectives of Superfund.

It is our belief that there are many staff persons within USEPA who would like to see this technology used at NPL sites, but feel restricted by the current language in the NCP. This language seems to require the lowest cost option be selected. The language of HR 3211 would remove this requirement and open the doors for more permanent solutions to be instituted at NPL sites. The drafters of this bill are to be congratulated on their forward oriented views of environmental protection.

Sincerely,

Richard J. Carlson
Director

RJC:JF:ct/2250E,2-3

Attachment (1)

INSERT 2

Illinois Environmental Protection Agency 2200 Churchill Road, Springfield, IL 62706

217/782-6762

September 12, 1986

Mr. Lee Thomas, Administrator
USEPA
401 "M" Street, S.W. A-100
Washington, D.C. 20460

Dear Mr. Thomas:

Over the past few years Illinois EPA has been a vigorous proponent of alternative treatment technologies. I know you share our concern for reducing dependence on the landfilling of hazardous waste. Over the past year we have been evaluating the procurement of a Transportable Thermal Destruction Unit (TTDU) that could be utilized at National Priority List (NPL) sites as well as sites in our State clean-up program. We have received statements of qualifications from 12 firms who are willing to construct, own and operate a TTDU at a site of our choosing. Attached is a list of these firms and the request for qualifications to which they responded.

IEPA intends to sign a contract for construction by January, 1986. My staff and several incinerator manufacturers have been in contact with USEPA employees in various regional offices and at headquarters attempting to identify what federal requirements must be met to operate a TTDU at a hazardous waste site. Due to the newness of this issue and the plethora of programs and regulations that are involved, it has been difficult to obtain consistent, clear answers to questions about relevant regulatory requirements. The regulations at issue involve RCRA, TSCA, CERCLA and the Clean Air Act. Therefore, I am requesting that a task force be formed by USEPA to establish a uniform regulatory policy regarding the use of TTDUs at clean-up sites. We suggest that the task force consist of appropriate regional and headquarters staff and a representative from the Edison, New Jersey laboratory that has had experience in operating a mobile incinerator. Illinois EPA would like to be represented and it might be appropriate to have a manufacturer of TTDU technology on the task force as well.

I believe it would be very helpful in reaching our mutual goal of decontaminating soils and destroying hazardous waste at NPL sites if there was a clear understanding of a reasonable regulatory structure that could be articulated to prospective users. I look forward to your reply.

Sincerely,

Richard J. Carlson
Director

RJC:JF:rc1993E/16-17

Attachment

cc: Val Adamkus

INSERT 3

STATE PROMOTING MOBILE WASTE INCINERATOR Oct. 4, 1985 (ML)

In the not too distant future, hazardous waste sites across Illinois will be permanently cleaned using mobile incinerators. At least that's the state's hope, as it launches into a first-in-the-nation hazardous waste disposal program.

The Illinois Environmental Protection Agency has received bids from about a dozen companies wanting to build a high-capacity mobile waste incinerator. The department expects the $4 million incinerator to be operational by next summer.

Putting an incinerator on wheels makes good sense.

Landfilling has been the preferred disposal method for years, in large part because of its lower cost. But landfills don't really clean up a problem, they simply move it to another location. Moreover, landfills can leak.

Landfilling, described by one IEPA official as a dumptruck and bulldozer mentality, is not really in the state's nor the environment's best interest.

When the state accepts the responsibility of cleaning up an abandoned waste site, it also accepts the financial liability should the resulting landfill leak. Consequently, the state has a vested interest in making sure hazardous waste sites are permanently neutralized.

That's where the mobile incinerator comes in.

Incineration of hazardous waste is not new; the technology has been around for decades and is used at numerous fixed-site locations to neutralize liquid wastes. But high-capacity mobile incineration has never been performed before, largely because companies had no assurance that a market for mobile incinerators existed. The state of Illinois has provided that assurance.

RECEIVED
OCT 07 1985

Under the new program, the IEPA will not purchase the incinerator. Instead,

ADD ONE

one company will be choosen to design, build and operate a mobile incinerator under the department's instructions. The incinerator will be first used next year to neutralize one or more Illinois hazardous waste sites not on the federal Superfund list.

This will make Illinois the first state in the nation to use on-site incineration. Moreover, department officials envision on-site burning as the wave of the future. This program will help perfect the technology so that some day, officials believe, governments will let bids for mobile waste cleanup much as they do today for road repairs.

The new mobile incinerator will be moved from site to site on about 10 flatbed trucks. About 25 skilled technicians will work three shifts to run the incinerator, which can neutralize contaminated land, sludge, liquid and drums.

Clean up time at most sites will run from four months to two years. The mobile incinerator will burn between five and 50 tons of hazardous waste per hour, at a per-ton cost of $200 to $400.

Higher cost is the only major drawback to incineration. Burning hazardous waste costs two to four times as much as landfilling. But these differences in cost will likely narrow, as incineration technology develops and landfill prices rise.

In the meantime, to encourage incineration, the state for over a year has given preference to disposal companies which landfill the least amount of waste. This incentive program, however, has been only marginally successful.

The new mobile incinerator should be very successful. By helping develop mobile incineration, the state is doing much more than providing incentives. It is helping change the face of technology in a way that will ensure the safe and permanent cleanup of hazardous wastes.

RECEIVED
OCT 07 1985

INSERT 4

Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, Illinois 62706
September, 1986
Vol. X, No. 8

Air Quality • Restricted Status Lifted • Contractor for VET Program

Progress

IEPA to Pilot Hazardous Waste Incinerator Project

Incineration as a disposal alternative for some types of hazardous wastes.

The Illinois EPA will begin a program to utilize a Transportable Thermal Destruction Unit or TTDU for the cleanup of hazardous wastes and toxic chemicals found at State and federal listed Superfund sites in Illinois. The Agency intends to hire a contractor to perform cleanup work and operate the incinerator. The successful use of a TTDU will enable the State to treat and destroy contaminated soils, liquids, sludges and drums in the field at multiple sites while minimizing the need for secure landfill space.

Limited landfill capacity exists in Illinois for disposal of hazardous industrial wastes; however, there is not sufficient room to dispose all of the cleanup residue from hazardous waste sites targeted for cleanup by the Illinois EPA and the U.S. EPA. Furthermore, many chemical compounds found at these sites are not suitable for landfills and are being prohibited from disposal in landfills by State and federal regulations.

Although the design and operation of disposal facilities which handle hazardous waste have significantly improved during the past few years,

(Continued on page 2)

Photo: *Part of the Modular Waste Processor - 2000, constructed by Pyrotech, a subsidiary of Environmental Systems, Inc., Little Rock, Arkansas. This processor will be used to incinerate wastes contaminated with dioxin in Jacksonville, Arkansas. Photo by David Humphreys.*

Contractor Selected for VET Program

On July 3, 1985 the IEPA opened 16 competitive bid proposals, from three firms (one firm turned in 14 alternatives) to operate the Illinois vehicle emissions testing program in Cook County and parts of DuPage, Lake, Madison, and St. Clair Counties. Bids ranged from a low of $4.61 to a high of $5.98 per test.

Combining the cost proposal with technical proposals, the evaluation committee, composed of representatives from the Bureau of the Budget, Illinois Secretary of State's Office, Illinois Department of Transportation, and the IEPA, selected the bid proposal that gave the best service for the price.

The evaluation committee selected Systems Control, Inc. who will conduct each test at a cost of $4.87. This fee will be paid by the state with revenue generated from the motor fuel tax. Motorists will not have to pay to have their vehicle inspected. Systems Control, Inc. is a California-based firm and operates similar vehicle testing programs in the states of Washington and Maryland. According to the contract, Systems Control, Inc. must obtain land, build and staff testing facilities and operate the testing program. The IEPA will oversee the program and have personnel at each testing station to answer questions which motorists may have.

The program is expected to begin May 1, 1986, and will be the largest centralized program in the United States. Approximately 2.4 million vehicles will be subject to the annual emissions test. There will be a total of 18 testing stations: 15 in the metropolitan Chicago area and three in the meteropolitan East St. Louis area. "Location of the testing stations will be designed to maximize the convenience for the vehicle owner," said Frank Sherman, Program Manager of Vehicle Inspection and Maintenance. "Most people will live within 12 miles of the testing station, while the average driving distance to a station will be only three and one-half miles."

Everyone subject to the program will receive specific instructions and a temporary sticker from the IEPA before the program begins.

If you have questions about the Vehicle Emissions Testing Program, please contact the IEPA Office of Public Information at 217/782-3397. ■

Incinerator Project (Continued from page 1)

disposal of such wastes in landfills does not provide permanent assurance of environmental protection. By incinerating hazardous or toxic wastes at the place where they are found, the volume and toxicity of the waste can be reduced eliminating the expense and liability of transporting untreated materials to distant disposal sites.

Generally, incineration involves four basic steps:

1) Raw wastes are fed into a primary chamber and heated to approximately 1,500°F. At this high temperature, contaminants contained in liquids, sludges and saturated soils are either burned or volatilized.
2) During the burning process, hot gas is collected and cycled through an afterburner. Here, at temperatures exceeding 2,200°F, remaining contaminants are burned off.
3) Following reburning, the residual gas is forced into a steam generating boiler and run through a water bath. The steam-laden gas that remains passes through a scrubber where particulates (soot) are removed.
4) In the final step, gas flows through a demister — a mechanism designed to remove excess water, along with any remaining particulates. The cleaned gas is then released through a stack into the air which is monitored by the Agency. Any remaining inert ash can be properly disposed of in a landfill.

Although the incineration process appears to be simple, the equipment and technology is sophisticated and expensive. In order to find the best incinerator and contractor to operate the apparatus, a statement of qualifications has been submitted by IEPA to prospective bidders. In response, about 70 firms expressed interest in this endeavor. Later this fall, the list will be shortened to about five companies. The Illinois EPA will make a contractor selection by January, 1986. The equipment is scheduled to be mobilized to cleanup a hazardous waste site next Spring with full scale operations next summer. Presently, there are several national priority Superfund sites and state listed sites which are suitable for the use of a TTDU. ■

Vol. X, No. 8, PROGRESS is published by the Illinois Environmental Protection Agency. Send all address changes, mailing requests and letters to the editor of PROGRESS, Illinois EPA, 2200 Churchill Road, Springfield, IL 62706. Phone (217) 782-3397.

Illinois Environmental Protection Agency

Director ..... Richard J. Carlson
Manager, Office of Public Information ..... Cinda Schum
Editor ..... Cinda Schum
Contributing Writers ..... Robert Casteel
Michael Collins
George Dillon
William Flower
Barnard P. Killian
Mary Robertson
Graphics ..... Gloria Ferguson
Bill Heaney
Photography ..... Robert Wistrolik
Typesetting ..... Judy Knous
Betty Schnapp

Restricted Status Lifted Temporarily for Some Public Water Supplies

The Pollution Control Board (PCB) adopted an emergency rule August 15 which lifts temporarily some public water supplies from restricted status. This action affects 91 percent of the public water supplies currently on restricted status because delivered water exceeds maximum contaminant levels of fluoride, combined radium, and/or gross alpha.

This emergency rule is effective until January 12, 1986. During this period, the PCB will be considering whether to adopt an identical rule proposed by the Illinois EPA which would extend the exemption until January 1, 1989.

Adoption of this emergency rule will allow the IEPA Division of Public Water Supplies to issue permits for water main extensions to public water supplies presently on restricted status delivering water to their customers containing: 1) fluoride at concentrations less than or equal to 4.0 mg/l; 2) combined radium 226 and 228 at concentrations less than or equal to 20 pCi/l; and 3) gross alpha particle activity at concentrations less than or equal to 60 pCi/l.

Permit applications for water main extensions should be filed with the DPWS by November 12, to allow for the normal time needed to process an application, and considering the emergency rule expires January 12, 1986.

About 101 supplies will no longer be on restricted status for exceeding the above concentrations. However, approximately ten public water supplies will still exceed the relaxed criteria and will continue to be on restricted status.

The Illinois EPA proposed the rule change on June 12. Public hearings were held July 30 and August 2.

The Pollution Control Board adopted the rule change by a vote of 5-2 on August 15. The Emergency Order stated, in part, "The overwhelming weight of the hearing testimony and documentary evidence presented to the Board in this docket convinces the Board that this regulatory relief can be granted with minimal risk of adverse impact to the health of the consumers of this water. The evidence is also compelling that emergency relief is necessary."

The Department of Energy and Natural Resources will prepare the required economic impact study on the effect of this rule change. The PCB will await that report before deciding whether or not to propose a longer term rule change.

DPWS Acting Manager Roger Selburg explained that it is important for public water supplies lifted temporarily from restricted status due to the rule change to understand that their delivered water still must comply with the unchanged standards for fluoride, combined radium and gross alpha activity. The emergency rule does not alter the requirements to comply with current concentration standards. Only restricted status is being affected, Selburg emphasized, to allow water main extensions during the term of the rule change. The standards of 1.8 to 2 mg/l fluoride, 5 pCi/l radium, and 15 pCi/l alpha still are in effect and would remain unchanged even if the rule change concerning restricted status is later extended to a longer term by the PCB.

Only restricted status is temporarily relaxed under the Pollution Control Board emergency rule to allow water main extensions; water quality standards still apply, explained Selburg.

Both IEPA Director Richard J. Carlson and Selburg said they wished to thank the public water supplies and organizations who assisted the Illinois EPA in obtaining this rule change. This thanks goes to all those who testified as well as those who assisted in the early efforts to obtain this relief.

Director Carlson explained that while the IEPA hopes the Pollution Control Board will adopt the proposal to lift restricted status for a longer period to January 1, 1989, public water supplies and developers must again be reminded that the current window of opportunity to allow water main extensions close January 12, 1986. ■

IEPA visits the Illinois State Fair

IEPA graphic designer Gloria Ferguson puts "Clean Illinois" button on young visitor.

IEPA Public Information Officers George Dillon, left, and Bob Cantrell at IEPA exhibit.

"Clean Air College for Kids" consisted of smoke school demonstrations by Air Pollution Staff Otto Klein, Fred Smith and Joe Wall.

Visitors read about household hazardous waste.

IEPA Director Richard J. Carlson interviewed by WRVI Reporter Randy Miller

Director Carlson talks to State Fair visitors.

188

Air Quality Continues Improvement

Air quality during 1984 continued to improve in most parts of the state, according to the Division of Air Pollution Control's annual air quality report. Readings from the statewide air monitoring network generally showed lower annual average and peak air pollution levels in 1984 than occurred in previous years. Over the long term, air quality improvement for two pollutants, sulfur dioxide and total suspended particulates, have been the most notable as shown in Figure 1. Substantial improvements in ambient concentrations of nitrogen dioxide, lead and carbon monoxide have also been recorded.

Mike Hayes, DAPC Manager, commented, "We expect the air quality to continue to improve because more and more older, polluting automobiles are being replaced with new, cleaner vehicles and because of improving pollution controls on industry. These continuing reductions in emissions of air pollutants should reflect a continuing improvement in air quality."

All the news in 1984 was not positive, however, as unhealthy air quality still persisted in several cities and industrial areas. Ozone continued to be the most pervasive pollutant problem with concentrations well above the air quality standard being measured in the Chicago and East St. Louis Metropolitan areas. In two industrial areas, Granite City and the Lake Calumet area of Chicago, a number of sites continued to measure total suspended particulates, airborne dust, in excess of the health standard. Again in 1984, elevated carbon monoxide levels within the downtown Chicago loop area were measured above the health standard.

Although these unhealthy readings were still occurring in 1984, the annual report clearly shows a downward trend in these problem areas with decided progress being made in attaining the air quality standards. "What is encouraging", stated Mike Hayes, "is that not only are the number of areas exceeding the health standards decreasing, but the geographic size of the remaining problem areas are also shrinking. The net result is that fewer and fewer persons are being exposed to unhealthful air quality." ■

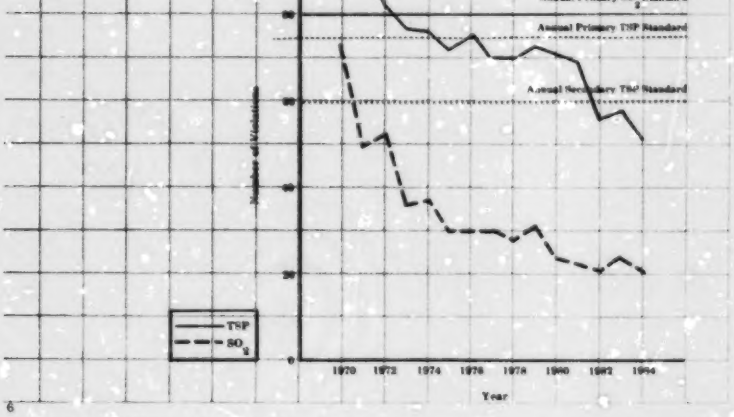

Figure 1. Statewide Trends for Sulfur Dioxide and Suspended Particulates

Public Comments Sought on Groundwater Protection

The Illinois Environmental Protection Agency invites public comments and recommendations to assist in the development of a State Groundwater Protection Plan. The Legislature has mandated that the Agency prepare such a plan by January 1, 1990. The legislation requires the proposed Plan to (1) "identify critical groundwaters that have been or are particularly susceptible to contamination by hazardous substances and probable sources of such contamination," and (2) "recommend the steps to be taken to prevent the degradation of the water quality in such areas." In addition, the Plan may "recommend the establishment of a system of classifying groundwaters based on their quality and use" and/or "the establishment of groundwater quality standards."

The IEPA wishes to encourage the maximum amount of public interest and involvement in the process of developing its Groundwater Protection Plan proposal. Nine workshops to discuss and seek public comment relating to groundwater will be held from 7 p.m. through 10 p.m. at the following locations:

October 3, Rockford, Episcopal Church
October 4, Champaign, Parkland Junior College
October 5, Libertyville, Township Hall
October 9, Wheaton, DuPage County Building
October 10, Joliet, Will County Farm Bureau
October 11, Moline, Holiday Inn
October 16, Peoria, Lakeview Museum
October 23, Carbondale, Student Center, SIU
October 25, Alton, Stratford Hotel

Three hearings will be held from noon through 3 p.m. at the following locations:

November 13, Chicago, Field Museum of Natural History
November 20, Collinsville, Holiday Inn
November 30, Springfield, Department of Transportation

Groups and individuals interested in the issue of groundwater protection are invited to contact William Hammel at the Illinois EPA, 2200 Churchill Road, Springfield, Illinois 62706, fax mail him at 217/782-3258.

Freedom of Information Coordinators

The Freedom of Information Act (FOIA) became effective in Illinois in July, 1984. The purpose of FOIA is to insure that Illinois citizens have access to all aspects of the conduct of State government by permitting personal inspection of most written material and providing copies of those reports for a minimal fee.

The Illinois EPA has adopted rules covering access to information of the IEPA and procedures for determining and protecting confidential information. Copies of these rules are available from the Agency.

If you are seeking information under the Freedom of Information Act, write to the attention of the IEPA division and person responsible for the records you require.

- Air Pollution -- Louise Donaldson
  Dean Gordon (provided
- Public Water Supplies -- Charles Affle
- Water Pollution -- Jim Gardner
- Land Pollution -- Jesse Sparkes
- Enforcement -- Brenda Bahay

All correspondence should be addressed to:
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, Illinois 62706
217/782-3258

Legislation

1985 was a busy legislative year for the Illinois Environmental Protection Agency. Thirteen bills amending the Environmental Protection Act were passed and sent to the Governor, along with major funding legislation for programs run by the Agency. Highlights of the legislative session include:

House Bill 993, the appropriation for the Build Illinois program, was signed by Governor Thompson on July 25, 1985. The bill contains approximately $44 million for wastewater treatment grants for 19 communities, plus some cost increase funding for previous projects. The bill also includes $10 million for a continuation of the Clean Illinois program which was created last year to help clean up hazardous waste sites that are not eligible for federal Superfund listing. The Governor's original Build Illinois program was to have made $280 million available for FY1986. However, the General Assembly added an extra $100 million worth of projects to HB 993, including over $25 million for sewer grants for approximately 35 cities. The Governor will appoint a special team to evaluate these projects and make recommendations on their funding.

House Bill 1498, the Chemical Safety Act, results from recommendations of the Governor's Chemical Safety Task Force. The bill will require that by July 1, 1986 certain businesses maintain a chemical safety contingency plan, including emergency equipment, evacuation plans, and a listing of substances which might be released. The bill also requires an employee education program by January 1, 1987. Reports of any significant releases are to be submitted to IEPA and to the Emergency Services and Disaster Agency.

House Bill 2280 and Senate Bill 114, both deal with the regulation of underground storage tanks. The bills would require registration of petroleum storage tanks with the Office of the State Fire Marshal and registration of tanks containing hazardous waste with IEPA. This is the first step in setting up an Illinois program to correspond to Subtitle I of RCRA, enacted in 1984. SB 114 also provides for an Orphan Underground Storage Tank Fund, made up of fees paid by tank owners, to be used for preventive or corrective action where there is a release from an underground tank and no owner can be found.

House Bill 1544 would require that new municipal waste incinerators which will burn 25 tons or more of solid waste per day use Best Available Control Technology to control air pollution emissions. As landfill capacity diminishes and public opposition increases regarding the siting of new landfills, it is expected that a number of municipalities will turn to incinerators. This legislation was proposed by Citizens for a Better Environment to create the regulatory framework to protect against toxic air pollutants from incinerators.

Legislation proposed by the Agency to strengthen our enforcement presence at landfills failed to pass in the last days of the session. Senate Bill 849 would have authorized the Agency to issue administrative citations to operators of sanitary landfills for any of 12 listed violations of state regulations. The Agency had sought this authority to beef up its solid waste regulatory program which has suffered in recent years as attention and resources have been focused on hazardous waste issues. Most of the listed violations (open burning, failure to cover waste at the end of each day, failure to contain blowing litter, etc.) do not pose major environmental threats. They are, however, the kinds of violations that cause problems for neighbors of such facilities. SB 849 passed the Senate 59 to 0 and was unanimously recommended by the House Energy Committee. However, on Second Reading in the House SB 849 became a Community Right to Know vehicle which failed to pass and subsequent efforts to revive the administrative order proposal were in vain.

The only strong opposition to SB 849 came from the Illinois State Chamber of Commerce which feared the bill would establish a "precedent" – the "precedent" presumably being an effective enforcement tool for minor environmental violations. Whether the Agency will propose to have this legislation introduced again will depend in part on whether it appears citizens desire that the Agency be able to respond more efficiently to landfill problems.

Rules and Regulations

Between July 1 and August 31, 1985, the IEPA has engaged in the following rulemaking activities:

PROPOSED RULES

35 Ill. Adm. Code 161, "Procedures for Determining and Protecting Confidential Information," proposed amendments published in the Illinois Register on July 19, 1985.

ADOPTED RULES

35 Ill. Adm. Code 656, "Procedures for Collection of Permit and Inspection Fees," published in the Illinois Register on July 12, 1985; effective July 1, 1985.

35 Ill. Adm. Code 840, "State Remedial Action Priorities List," published in the Illinois Register on August 9, 1985; effective July 24, 1985.

Progress
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, IL 62706

ADDRESS CORRECTION REQUESTED

BULK RATE
U.S. POSTAGE
PAID
PERMIT 704
SPRINGFIELD, IL

Discover The Magnificent Miles of Illinois

Printed by authority of the State of Illinois

APPENDIX C.—CORRESPONDENCE FROM IMPACO, INC., CONCERNING EXPERIENCE WITH EPA AND IMPACO'S PATENTED INNOVATIVE WASTE CLEANUP SYSTEM

IMPACO INC.

201-222-1517 27 wardell circle oceanport, nj 07757 201-222-4540

toxic waste control & containment

September 16, 1985

The Honorable Charles W Stenholm, Chairman
House Small Business Subcommittee on
Energy, the Environment, and Saftey
R-363 Rayburn HOR
Washington, DC 20512

Dear Mr. Chairman:

It is our understanding that the Subcommitta on Energy, the Environment, and Safety recently held a hearing on the testing and implementation of innovative technologies for the permanent clean-up of the nation's uncontrolled hazardous waste sites under the Superfund program.

We would like to make you aware of our experiences with regard to an innovative hazardous waste cleanup system we have patented, and EPA's response.

Briefly, our system makes use of impacted reinforced concrete tongue and groove sections in sealed relation to the upper surface of a naturally occurring aqualude which defines as enclosed area. Within the enclosed area there is a geometric series of sand drains which serve as wicks for the collection of toxic fluids. The wicks communicate at the upper ends thereof with gravel windows leading to a collection pool from which the liquids are pumped off for refining, incineration, recirculation and/or remain with natural osmosis occuring.

On September 8, 1982, accompanied with my engineer, I met with Jacquline E. Shafer, Regional Administrator of the U.S.E.P.A. The result of this metting was a letter (attached) from Patricia Gillen, Project Manager, which thanked us for a commendable presentation. Ms. Shafer then arranged a meeting with the U.S.E.P.A. people in Cincinati on January 17, 1983. The result of this meeting was a memo (attached) written on February 3, 1983 by Walter E. Grube, Jr., Soil Scientist to Donald E.Sanning,Program Manager. It appeared to me that this proposal was dismissed "out of hand" within ten (10) working days as having little or no value. In Mr. Grube's memo, it is obvious to me that he neither understood the proposal fully as presented nor understood the manner in which this technology operates. Reference is made to paragraph 3 of the memo lines 10, 11, & 12. This method does <u>not</u> call for the removal of any soil. In addition there were five

BEST COPY AVAILABLE

IMPACO INC.

201-222-1517 27 wardell circle oceanport, nj 07757 201-222-4540

toxic waste control & containment

additional question marks; paragraph 1, (2) 2, (1) 3, (1) 6, (1). It would seem to me that at least an additional meeting could have been called to clarify the questions and allow IMPACO to fully explain it's proposal. On February 15, 1983, Mr. Sanning wrote to IMPACO. In his letter (attached), Mr. Sanning was in basic technical agreement with Dr. Grube, however, he apologized for not being more positive at that time. Subsequently I requested an additional meeting with the U.S.E.P.A. via telephone with Mr. Sanning. The result of this conversation led me to believe that the U.S.E.P.A. had no interest in my proposal. Since that time this proposal has been taken to private industry; (Exxon, Shell, Cyanamid, and Borden). These corporations showed an avid interest in this technology, however, it was evident that without a U.S.E.P.A. "good housekeeping" certificate, these corporations wouldn't consider it.

Mr. Chairman, we would like to submit this letter, and the accompanying documents, for the hearing record of the Subcommitee's September 3rd hearing on the implementation of innovative technologies for Superfund cleanup.

Thank you for your assistance in this matter.

Respectfully yours,

Norman Wickberg
President

Enclosure

BEST COPY AVAILABLE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

9 SEP 1982

Stanley R. Ottoson, P.E.
Ottoson & Ottoson
411 North Avenue, East
Cranford, New Jersey 07016

Dear Mr. Ottoson:

I would like to take this opportunity to thank you for the presentation that you gave us yesterday on impoundment and drainage of hazardous wastes.

Since we are heavily involved in evaluating conditions at hazerdous wastes sites, and the preparation of remedial alternatives, your presentation was very timely and informative.

Again, on behalf of my Section and Branch let me thank you for the commendable presentation.

Sincerely yours,

Patricia A Gillen

Patricia Gillen
Project Manger
Hazardous Waste Site Branch

BEST COPY AVAILABLE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
CINCINNATI, OHIO 45268

DATE: February 3, 1983

SUBJECT: January 17, 1983 Proposal: "IMPACO Patented Design and Method of Construction for the Impoundment and Drainage of Hazardous and Toxic Waste Facilities - Pilot Project," IMPACO, Inc.

FROM: Walter E. Grube, Jr., Soil Scientist
Disposal Branch, SHWRD, MERL

TO: Donald E. Sanning, Program Manager
Uncontrolled Hazardous Sites Research, Disposal Branch, SHWRD, MERL

Following are some thoughts and opinions I developed upon reading this proposal for a concrete containment wall and sand wick drain system.

I am not aware of any uncontrolled chemical dump sites where there exists a confirmed, tight aquaclude as an underlying strata at some reasonable depth of a few tens of feet below the land surface. This lack of certainty regarding the site bassment should be removed before any further consideration is given to the proposed approach. I am not aware of any means by which the formation of the bulbous base formed at the base of each concrete panel can be verified. Mere presumption that this geometric configuration will result from the pressure imposed on the surface of the un-set panel should not be accepted. Likewise, I am not aware of any certain means to guarantee that there will be no gap between adjacent panels as constructed. Continuity of constructed features underground, where no direct observation or spot testing is possible, is a prime concern in many of the construction proposals we have been asked to review. Until some, probably refined geophysical technique, method is available to confirm with a high degree of confidence that the constructed barrier is actually in place as designed, we will be floating on the expert judgement of various proposing engineers.

This proposal does not present any experiential, theoretical, or other supportive information which we could review in order to judge upon the technical validity of the proposal. Citation of the site parameters and design characteristics of installations reputedly already placed for construction of structures would be a useful beginning. Statements of the calculations, soil parameters that need to be measured, characteristics of gradation of the sand used compared to the site soil, examples of fluid transit times expected with example scenarios, and impacts of various specified qualities of groundwater that are expected to migrate through an installation should be provided so that we can better judge feasibility. This proposal just does not present sufficient depth of theory, example scenarios, sample calculations, or data from actual operating experience in a comparable situation, for use to make a judgement.

Example situations should be presented which show how much volume or weight of overburden material must be added to a site of certain stated properties. Given a site with soil of stated texture, consistency, and other relevant properties; contaminated with a groundwater of stated quality and

composition of stated chemicals; it should be possible to calculate the rate of groundwater extraction and movement toward the sand columns which a specified additional overburden is placed in on the site surface. The quality of sand, in terms of difference in texture from the site soil matrix needed, should be calculatable, such that perhaps some cost savings could be realized by mixing site soil with imported sand. The proposal simply assumes that site soil removed from the holes in which the sand columns are placed will be disposed of appropriately. This may be a significant single cost, which is not discussed but may impact the total cost of work at a site.

Historical data, experimental study data, or citation from published work should be presented which demonstrates that the concrete barrier, if not of faulty construction, is capable of constraining the contaminated groundwater. Here again, the proposal fails to present detailed supportive data, or substantial theory from which a sound engineering basis can be derived. In the absence of data extracted from already constructed and monitored installations, or citations of reports which contain this information, we can only rely on hearsay regarding the capability of concrete to withstand the migration of contaminated groundwater.

The approach proposed relies heavily on our acquiring both a suitable site and extensive supportive aspects both front-end and post-construction monitoring. This proposal is unusual in expecting our office to perform all of these loose ends.

It appears to me that the authors of this proposal may benefit substantially from reviewing technical proposals submitted to this Agency for other technical fixes at uncontrolled dump sites. A re-submittal which includes substantially more details and provision for other aspects of site activity would be minimum expectation. A scenario applied to a known real site would be useful. Aside from administrative shortcomings, I have serious apprehensions regarding the technical aspects; these are described above. Supported response to these and other technical aspects may lead to increased optimism regarding this proposal.

Walter E. Grube, Jr.

cc: R. D. Hill
N. B. Schomaker

BEST COPY AVAILABLE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
CINCINNATI, OHIO 45268

February 15, 1983

Mr. Bernard Gwilliam
IMPACO, Inc.
27 Wardell Circle
Oceanport, NJ 07757

Dear Mr. Gwilliam:

In reference to your preproposal dated January 17, 1983, on the installation of a pilot project to demonstrate the effectiveness of the IMPACO patented system, we have completed our review. To the best of my knowledge the USEPA does not award grants to private profit making organizations. Our organization, the Solid and Hazardous Waste Research Division (SHWRD) certainly does not. Both Dr. Walter E. Grube, Jr., and myself reviewed the preproposal. Dr. Grube's review/comments are attached. I am in basic technical agreement with Dr. Grube's comments, however, I would not encourage you to put forth any additional effort to address the perceived information inadequacies addressed in Dr. Grube's comments. Although the IMPACO patented system could have potential application to remedial actions at uncontrolled hazardous waste sites, there is no driving force within the USEPA/SHWRD to fund such an effort in deference to already planned activities. These planned activities have been worked out with the Office of Emergency and Remedial Response (OERR) over a period of a year. Your preproposal along with this correspondence and Dr. Grube's comments will be forwarded to Mr. Richard Stanford of OERR for their attention and consideration. Knowing the present state of cleanup activities by the Agency at Superfund sites, I am not optimistic that the IMPACO patented system would be considered a viable alternative to techniques and/or remedial action systems presently being considered or in use.

I would like to extend my thanks on behalf of the USEPA for the obvious effort and interest you and IMPACO, Inc., have shown toward solving one of our Nation's greatest environmental concerns. I am sorry that we cannot be more positive at this time.

Sincerely yours,

Donald E. Sanning

Donald E. Sanning, Program Manager
Uncontrolled Hazardous Waste Sites Research
Solid and Hazardous Waste Research Division
Municipal Environmental Research Laboratory

Enclosure

cc: Walter E. Grube, Jr.

EXHIBIT 1

IMPACO - WASTE DISPOSAL SYSTEM

A system for constructing a disposal facility for hazardous and toxic waste materials, which will protect the environment has been devised. The system makes innovative use of tried and tested techniques and results in an effective facility at minimum costs.

The first step in the procedure is to locate a site having a continuous Aquaclude or impervious strata overlying any water bearing formations. This must be determined from a knowledge of the geology of the area, and by an intensive study including test borings, test wells, soil analysis, etc.

The main feature of the system is a continuous concrete cutoff wall completely surrounding the disposal site. The wall is constructed by driving a pile form through the upper strates to the Aquaclude. A quantity of concrete is placed into the form from the top, and while it is still plastic, compacted using a pile driving hammer acting against a ram causing a bulb of concrete to form at the bottom of the form, which acts as a seal in the Aquaclude. The ram and hammer are then removed, additional concrete is placed in the form to fill it to grade level, and the pile form is withdrawn. The pile form has an interlocking tongue and groove shape, and as adjoining piles are installed, a continuous concrete wall, sealed at the bottom, has been formed. When such a cutoff wall has been installed around the disposal site, toxic or hazardous materials placed on the site are restricted within the walled area, and cannot reach subterranean

water because of the Aquaclude.

A second phase of the syster includes the installation of a number of vertical sand columns within the walled area. These columns penetrate the upper stratas, terminating on the top of the Aquaclude. A network of collectors connect the tops of the columns and terminate in a collector sump. As solid waste is placed within the walled area, the weight of the material causes liquids contained in the waste to flow to the sand drains, up through the sand columns to the collector network and into the collector sump. There it can be pumped away for treatment, incineration or other lawful disposal. This second phase is similar to systems in use to dewater, consolidate and stabilize underground stratas of earth for construction purposes.

APPENDIX D.—PREPARED STATEMENT OF J. ROBERT NICHOLSON, VICE PRESIDENT, ZIMPRO, INC.

September 3, 1985

Committee on Small Business
Subcommittee on Energy/Environment
B-363 RHOB
Washington, DC 20515

RE: H.R. 3211

Dear Mr. Stenholm,

We appreciate receiving the letter of 8/14/85 from your Chairman, Congressman Stenholm, inviting Zimpro Inc. to provide testimony at a hearing of the subcommittee on September 3, 1985. Although we are supportive of this legislation as an amendment to H.R. 2817, unfortunately we cannot attend the hearing on that date. However, we have prepared testimony for the record of the hearing which is enclosed.

Thank you for requesting our testimony on this critical issue--one which should be given significant consideration as Congress continues its reauthorization of Superfund.

Very truly yours,

J. Robert Nicholson/mx

J. Robert Nicholson
Vice President

MILITARY ROAD
ROTHSCHILD, WISCONSIN 54474
TELEPHONE (715) 359-7211 TELEX 29-0495

BEST COPY AVAILABLE

TESTIMONY FOR

THE SUBCOMMITTEE ON ENERGY, ENVIRONMENT, & SAFETY ISSUES

COMMITTEE ON SMALL BUSINESS

HOUSE OF REPRESENTATIVES

By:

Mr. J. ROBERT NICHOLSON, VICE PRESIDENT

ZIMPRO INC.

A MICHIGAN TECH VENTURES COMPANY

September 3, 1985

BEST COPY AVAILABLE

Chairman and Members of the Subcommittee, my name is J. Robert Nicholson, Vice President of Government Affairs of Zimpro Inc., Rothschild, W, a Michigan Tech Ventures Company. I appear before you on behalf of over 200 employees of our company who have made it their career to solve waste treatment problems. Since the late 1950s, our company has worked with hundreds of municipalities and industries in the United States as well as overseas and has developed a wide range technology for environmental control.

Success Stories

Over the years, Zimpro Inc. has generated some significant technologies for application to municipal and industral wastewaters and sludges. This development is the result of a long process involving years of laboratory experimentation and pilot plant testing. This activity is fueled by the expectation that when the process or equipment has been developed to the point of where it is efficient and reliable enough for commercial application, there will be a market in which the company will be able to sell the technology, recover its research, development, commercialization costs, and make a profit.

A number of our breakthroughs are commercialized and are being applied today. One example...we are just commercial'zing a new process, which uses our Hydro Clear sand filter and can save municipalities more than 20% in capital and operating costs without sacrificing effluent quality. It is called Primary Effluent Filtration--"PEF" for short--and involves filtering wastewater first before it is treated by secondary treatment methods. In simple terms, we found that by filtering pollutants out early in the treatment scheme, we can cut back substantially...or even eliminate...the need for energy-consuming secondary treatment. We have spent several years and hundreds of thousands of dollars to develop PEF, including support of a research project at the University of California at Davis.

BEST COPY AVAILABLE

Some of our other developments include turning sewage sludge into burnable fuel to generate steam and power; destroying PCBs and other toxics using the wet air oxidation process; recycling wastewater through the use of powdered activated carbon. The latter process is called "PACT"--powdered activated carbon treatment. Most recently it was applied to treatment of municipal wastewater at El Paso, Texas converting domestic sewage to high quality effluent that is pumped into a groundwater aquifer that feeds the area's drinking water system. The plant, owned and operated by El Paso Utilities, was dedicated in June, 1985.

Construction Grants Program

Zimpro has considerable experience with the innovative/alternative technology program, under the Constructon Grants of the Clean Water Act. This program was developed to encourage the use of less costly or more efficient technologies in the protection of our rivers and streams from municipal sewage pollution. The original innovative and alternative technology program was authorized for only a three-year period with some grant incentives to the municipalities for its use. Since that time the program has been made a permanent part of the Clean Water Act with sufficient language and increased grant incentives to make it clear to all participants that it is the policy of the Congress to encourage innovation in wastewater treatment. Although H.R. 3211 contains no grant mechanism, we feel that the proposed legislation of H.R. 3211 again makes the intent of Congress clear by instructing the EPA to implement a demonstration of innovative and alternative technologies for Superfund cleanups.

Superfund Marketplace

Wet air oxidation and PACT have also been applied to the treatment of hazardous and toxic wastes under RCRA and CERCLA. Although these are proven processes, their application to the detoxification of hazardous and toxic wastes is new and should also be made eligible for EPA demonstration as proposed

BEST COPY AVAILABLE

in H.R. 3211. We have committed research, development and commercialization dollars to these process applications, and have recorded some success in California and Michigan for wastes regulated under RCRA. In attempting to market these technologies in the Superfund arena, however, we find that it is difficult to compete with land-based alternatives such as deep-well injection or landfills even though Congress has expressed legislative disfavor with these alternatives. It is hard to beat the EPA system that fosters earth-moving, endless paper studies, and transportation of wastes to sites far away, but does little to encourage the EPA contractor to seriously consider treatment technologies--let alone recommend them. On many sites, treatment represents the most economic and environmentally sound long-term solution.

We firmly believe there is a need to demonstrate and implement innovative/alternative technologies for Superfund cleanup. The proposed Office of Demonstration is a necessity not only for an open marketplace (countering the EPA bias), but gives public evidence of the expressed policy of Congress--that is, land disposal--only as a last resort. Hopefully, the legislative push of H.R. 3211--especially for small businesses--will force technology. We particularly note and encourage the revision to the National Contingency Plan required by Section (f) of H.R. 3211.

Also, since the administration of site cleanups can be handled by either the EPA or an appropriate state agency, we suggest ammending the proposed legislation to make it clear that this demonstration program shall be applied to both state or EPA-administered site cleanups using federal funds.

* * * * *

BEST COPY AVAILABLE